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ENTRIES 1853-3061

AGRONOMY

C. V. PIPER, *Editor*

1853. ANONYMOUS. **Seed mixtures for land affected by clover sickness.** Jour. Bd. Agric. [London] 25: 1497-1499. 1919.

1854. BARBER, C. A. **The growth of sugar cane.** Internat. Sugar Jour. 21: 506-510. *1 pl., 12 fig.* 1919.—The first of a series of articles discussing certain points connected with the growth of sugar cane is presented for the agriculturalist. This article explains and illustrates very clearly the growth of a cane plant from both the cane seed and the cane set.—*E. Koch.*

1855. BARTHE, A. E. **Organizacion moderna de los campos experimentales. IV. Auxilios matematicos en los ensayos culturales. [Mathematical aids in cultural experiments.]** Revist. Agric. Com. y Trab. 2: 399-406. *Fig. 10-12.* 1919.—Bibliography appended.

1856. BIGGAR, H. HOWARD. **The relation of certain ear characters to yield in corn.** Jour. Amer. Soc. Agron. 11: 230-235. 1919.—The paper deals with the relation between certain ear characters and yield, in 5 varieties of maize grown at different points. The characters considered are; length of ear, weight of ear, number of rows of kernels and the shelling percentage. The results show that there seems to be no special relation between number of rows of kernels on the ears and yield, or between shelling percentage and yield. The characters of length and weight of ears show positive correlations with yield, but they are not consistently large. The character of length seems to be somewhat significant, at least for some of the varieties. The results suggest that there is no well-marked basis for using ear characters to indicate yield possibilities.—*F. M. Schertz.*

1857. BOAS. [Rev. of: **Die Unkrautbekämpfung durch Kainit und Kalkstickstoff auf Ackerland. (Weed control through kainite and calcium cyanamide in arable land.)** Deutsch. Landw. Presse 1916: 709-717. 1916.] Zeitschr. Pflanzenkrankh. 29: 57. 1919.—Wild radish, buttercup, lambs' quarters, and dock may be exterminated by application of either substance, with unusually good results. The cost is high. Thistles are resistant.—*H. T. Güssow.*

1858. BRACKEN, JOHN. **Sunflower silage.** Agric. Gaz. Canada 6: 542-543. June, 1919.—Sunflower silage fed to milking cows at the University of Saskatchewan produced slightly more milk, pound for pound, than did oat silage. Yields of sunflowers were twice as great when compared with corn. When the seed is in the milk stage the sunflower crop is considered in the best stage for silage.—*O. W. Dynes.*

1859. Brenchley, Winifred E. **Eradication of weeds by sprays and manures.** Jour. Bd. Agric. [London] 25: 1474–1482. 1919.

1860. Burgess, J. L., and C. H. Walkden. **Farm weeds of North Carolina and methods for their control.** Bull. North Carolina Dept. Agric. 40°: 3–53. *Illustrated.* 1919.—This paper is a descriptive account of 25 species of plants which are regarded as farm weeds. Each species is illustrated by line drawings of the plant organs and means of control are suggested.—*R. A. Jehle.*

1861. Butler, O. **Effect of wounds on loss of weight of potatoes.** Jour. Amer. Soc. Agron. 11: 304–306. 1919.—The loss in weight due to wounding was rapid during the first week of storage at 8–10°C. and decreased thereafter. The increased loss of weight due to wounding becomes extinct after 79 days when cut and uncut potatoes lose weight about equally. Slight wounding occasions a loss of more than 2 per cent by weight.—*F. M. Scherz.*

1862. Cook, O. F. **Experiments in spacing cotton.** Jour. Amer. Soc. Agron. 11: 299–303. 1919.—Experiments show that control of branching can be used to advantage. Because of the peculiar habits of the plant, spacing can best be determined by local control experiments for each variety of cotton.—*F. M. Scherz.*

1863. Doyle, H. W. **How they do it in Kaw Valley.** Potato Mag. 2¹: 6–7, 24, 26. 3 *fig.* 1919.—Describes potato culture in the Kansas River valley.—*Donald Folsom.*

1864. Ellis, J. H. **Silage crops other than corn.** Agric. Gaz. Canada 6: 540–541. June, 1919.—At the Manitoba Agricultural College each of 7 experimental silos was filled in the autumn of 1918 with the following crops: corn (maize), Sudan grass, millet, alfalfa, mixed cereals and peas in equal quantities, rape, buckwheat. Each crop was cut and ensiled when it was judged that the proper stage had been reached. The silos were opened on February 3, 1919, and samples analysed. Palatability tests were conducted with dairy cows. The silage in all 7 of the silos was in an excellent state of preservation. The cows showed a preference for Sudan grass silage with alfalfa ranking second. The others were eaten with equal relish, except that of buckwheat which was refused until all the others had been withheld. In general, oats and peas, or Sudan grass, is recommended as the best substitute for corn for silage where corn can not be grown successfully.—*O. W. Dynes.*

1865. Gaines, E. F. **Two important varieties of winter wheat.** Washington [State] Agric. Exp. Sta. Popular Bull. 116. 7 *p.*, 2 *fig.* 1919.—Red Russian and Hybrid 128, tested for yield from 1905 to 1918 inclusive showed 38.8 and 43.3 bushels respectively. The effect of time of seeding on yield and amount of emut (*Tilletia tritici*) is presented on the basis of a two-year average. Seeding on September 1 gave higher yield than earlier or later plantings. The per cent of smut was in agreement with that reported in other Washington Experiment Station bulletins (Bull. 125 and Popular Bull. 115).—*F. D. Heald.*

1866. Gessner, E. R. **Sugar cane culture.** Union of South Africa Dept. Agric. Bull. (Local Ser.) 84. 6 *p.* 1919.

1867. Hearnen, Wm. P. **The vitality of alfalfa seed as affected by age.** Proc. Colorado Sci. Soc. 9: 239–249. 1919.—Tests show sound, clean alfalfa seed kept under "fair conditions" did not lose perceptibly in vitality in 23½ years; good commercial seed stored under "rather disadvantageous conditions" germinated 46 per cent after 27½ years; inferior seed under "rather indifferent conditions" had 16.5 per cent viable seeds when 2½ years old. Short bibliography.—*W. W. Robbins.*

1868. Hendry, G. W. **Climatic adaptations of the white Tepary beans.** Jour. Amer. Soc. Agron. 11: 247–252. 1919.—Tepary beans grown in the cool climates of the central and northern California coast districts develop abnormally. The white Tepary is more prolific than varieties of *Phaseolus vulgaris* in the semiarid interior districts of California. The white

Tepary is less prolific than varieties of *Phaseolus vulgaris* in the subhumid coast districts of central and northern California. The preblossoming period, the blossoming period and the life period are each functions of the climate. They are longer in cool climates than in warm climates and they are either increased or diminished as the planting date causes them to occur during cool or warm weather.—*F. M. Scherts.*

1869. JOHNSON, T. C. Potato growing in Eastern Virginia. Potato Mag. 2[2]: 8–9, 24–25. *1 fig.* 1919.

1870. KARRAKER, P. E. What is the value of the usual laboratory work given in general soil courses? Jour. Amer. Soc. Agron. 11: 253, 256. 1919.

1871. KEELER, M. D. Profits of commercial potato storage. Potato Mag. 2[2]: 10–13, 30. *1 fig.* 1919.—Also describes methods and plans for use on farms.—*Donald Folsom.*

1872. KIESSELBACH, T. A. Experimental error in field trials. Jour. Amer. Soc. Agron. 11: 235–241. 1919.—See Bot. Absts. 4, Entry 378.

1873. KINCER, JOSEPH B. Temperature influence on planting and harvest dates. Monthly Weather Rev. 47: 312–323. *20 fig.* 1919.

1874. KRISHNAMURTI, ROW K. The effect of salinity on the growth and composition of sugar cane varieties. Agric. Jour. India 14: 476–493. *11 pl., 5 charts.* 1919.—See Bot. Abst. 3, Entry 2928.

1875. MACMILLAN, H. G. The vitality of alfalfa roots. Proc. Colorado Sci. Soc. 9: 251–252. 1919.—Cites unusual vitality of alfalfa roots, and the ability of an alfalfa root shattered and decayed at both ends, without a crown, and with no opportunity for growth in a cultivated field for 1 year, to send out from an adventitious bud 3 shoots, 1 of which bore leaves and rootlets.—*W. W. Robbins.*

1876. MAINWARING, C. Linseed. Rhodesia Agric. Jour. 16: 326–327. *1 pl.* 1919.

1877. MAINWARING, C. Weeds. Rhodesia Agric. Jour. 16: 313–315. *1 pl.* 1919.

1878. MATHEWS, J. W. Economic plants at the National Botanic Gardens, Kirstenbosch, and the aim of their cultivation. South African Jour. Indust. 2: 749–758. 1919.

1879. MORENO, EDUARDO. La combustibilidad del tabaco. Centribucion al estudio agro-quemico de la hoja. [Combustibility of tobacco.] Revist. Agric. Com. y Trab. 2: 377–379. 1919.—In a series of tests on the effect of different fertilising materials on the burning quality of tobacco it was found that a mixture of the double phosphate of lime, ammonium sulphate and sulphate of potash increased the combustibility; cyanamide may be applied in only very small quantities due to danger of toxic effects, and potash should be applied in the form of sulphate.—*F. M. Blodgett.*

1880. PRESTON, C. F. Comparison of varieties in Pennsylvania. Potato Mag. 2[2]: 14–15. *1 fig.* 1919.

1881. ROBSON, R. Control of the weeds Whitlow pepperwort and black mustard. Jour. Bd. Agric. [London] 26: 56–63. *4 fig.* 1919.—Whitlow pepperwort (*Lepidium draba*), a weed said to be above ground as bad as charlock and below ground as bad as bindweed, can be satisfactorily controlled by spraying with copper sulphate alone at the rate of 80 gallons of a 4 per cent solution per acre, or with copper sulphate in combination with either ammonium sulphate or sodium nitrate.—Black mustard (*Sinapis nigra*) was also controlled by similar means.—*M. B. McKay.*

1882. Severance, George. Twenty-eighth annual report for the year ending June 30, 1918. Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—Contains brief summary reports of experimental work, including the following of interest to botanists: Botany (weeds), chemistry (some phases of soil science), farm crops, horticulture, plant pathology and soils. The pathologist's report contains the first published record of the aecial stage of *Puccinia graminis* on barberry for the Pacific coast, though specimens had been collected as early as 1896.—*F. D. Heald.*

1883. Sewell, M. C. Tillage; a review of the literature. Jour. Amer. Soc. Agron. 11: 269–290. 1919.—The review includes the early history and philosophy of tillage; preparation of seedbeds; cultivation of crops as related to soil moisture, nitrification and yield; soil aeration and nitrification. The review leads to the following conclusions: Plowing deeper than 7 inches has not generally resulted in increased crop yields; the best depth of plowing, less than 7 inches, has not been determined; the question of frequency of plowing has not been answered; cultivation may be necessary only to kill weeds and keep the soil in a receptive state to absorb rainfall.—*F. M. Schertz.*

1884. Sievers, F. J., and E. G. Schafer. Sugar beets under irrigation in Washington. Washington [State] Agric. Exp. Sta. Bull. 154. *41 p., 11 fig.* 1919.—A popular account without experimental data.—*F. D. Heald.*

1885. Skvortzow, B. W. Notes on the agriculture, botany and zoology of China. Jour. North China Branch Roy. Asiatic Soc. 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Abstr. 3, Entry 2402.

1886. Smith, J. W. The effect of weather upon the yield of potatoes. Potato Mag. 1[a]: 11–14, 32; 1[b]: 15–17; 1[c]: 7, 16–17, 27; 2[a]: 16–17, 33–34. *Fig. 1–23.* 1919.—Summarizes data regarding relationship of mean temperature to regions of origin, to growth and to time of planting and harvesting; frost dates; water requirements; thermal constants; temperature and rainfall by 10- to 50-day periods; importation of seed potatoes; optimum conditions for various diseases.—*Donald Folsom.*

1887. Staplehon, R. G., and Hilda Loveday. "Shelled" grain in oats. Jour. Bd. Agric. [London] 26: 489–496. 1919.—A certain amount of shelled grain, usually not exceeding 3 to 5 per cent by weight, is of common occurrence in oat samples received at the seed testing laboratory. On the average, the shelled grain germinates about 24 per cent below the normal unshelled grain. This relatively poor germination is not due to the influence of drying on the unprotected grain, but would seem to be due to the mechanical injury received during the thrashing operations.—*M. B. McKay.*

1888. Stapledon, R. G. The temporary ley. Jour. Bd. Agric. [London] 25: 1280–1311. 1919.—Experimental evidence is presented to show the most desirable seed mixtures to be used in the temporary ley in Wales. For the 3- to 4-years ley the following species may be used with confidence at the indicated rate in pounds per acre: perennial rye-grass 7–14, cocksfoot 6–12, timothy 3–5, rough-stalked meadow-grass 1½–2, crested dog's tail 1½–2, late flowering red clover 3–4, Alsike clover 1, wild white clover ½–1; total minimum to acre 28 to 30 pounds, maximum 35 pounds. For a two-years ley slight modification of the mixture is necessary: rough-stalked meadow-grass and crested dog's tail should be omitted; English white clover could often replace wild white clover or a mixture of the two may be used, a mixture of broad red clover and late flowering red clover should always be used; the rye-grass should consist in part of Italian rye-grass; cocksfoot and timothy ought to be retained in most mixtures; on very dry soils the inclusion of tall oat grass is often an advantage.—*M. B. McKay.*

1889. Stapledon, R. G., and Margaret Adams. The effect of drying on the germination of cereals. Jour. Bd. Agric. [London] 26: 364–381. 1919.—Many samples of cereal seed received during two seasons at the seed testing station gave poor germination when first

received. As a rule, the germination of such seed was much higher when retested after either kiln-drying for 3 days at 40°C. or air-drying for three weeks at laboratory temperatures. Wheat, barley, and rye responded better to kiln-drying than to air-drying. Oats, on the other hand, responded better to air-drying. The apparent condition of a sample frequently afforded little or no index to its germination. Samples of seed which give a low germination in the "as received" test should be retested after conditioning. In such cases the retest gives, as a rule, a better index of the commerical valus of the sample for seed purposes.—*M. B. McKay.*

1890. STEAD, ARTHUR. The sulphur requirements of crops. Agric. Jour. South Africa 10: 13–21. 1919.

1891. TALMAGE, R. H. Intensive potato growing on Long Island. Potato Mag. 2¹: 9, 29. 3 *fig.* 1919.

1892. TAYLOR, E. P. Uniformity of rules and regulations of potato seed certification. Potato Mag. 2¹: 7, 21–23. 1 *fig.* 1919.

1893. TAYLOR, H. W. Tobacco seed beds. Rhodesia Agric. Jour. 16: 306–312. 1919.

1894. TOHN, P. H. The cultivation of aromatic plants in the United States. Amer. Jour. Pharm. 91: 437–441. 1919.—The author reviews the volatile oil industry, placing emphasis on the development of this industry in the United States. A number of volatile oils are discussed as to the present sources, necessary climatic conditions, etc. During the past few years the production of aromatic oils has increased to a very great extent in the United States. The production of some of the principal volatile oils, as peppermint, spearmint, pennyroyal, wintergreen and sweet birch, is not only sufficient for American needs but permits a large exportation to foreign countries. It is intresting to note that in the case of peppermint, about nine-tenths of the total world's supply is produced in a few counties of southern Michigan and northern Indiana. In summarizing the prospects for home production the author states that it would seem that in our vast country, with its variety of climates—hot, cool, dry and humid—and its endless varieties of soils and geological formations, a suitable combination of soil and climate can be found for every perfume bearing plant of present importance to the trade. The one single determining factor that will make successful culture of these plants possible or impossible seems to be the element of labor.—*Anton Hogstad, Jr.*

1895. TRUEMAN, J. M. Silage crops other than corn. Agric. Gaz. Canada 6: 538–539. June, 1919.—Results of experiments carried on at the Nova Scotia Agricultural College for the past 5 years indicate that a mixture of oats, peas, and vetches will produce a higher yield than Indian corn. The average analysis of this mixture compared with immature corn shows 6.78 per cent more in dry matter and 58 per cent more protein. A satisfactory silage is made of a mixture of these three crops.—*O. W. Dynes.*

1896. WALE, BERNARD N. The removal of hedgerows. Jour. Bd. Agric. [London] 25: 1408–1424. 1919.—See Bot. Abstr. 3, Entry 2068.

1897. WATERBURY, H. E. Colorado stores her own potatoes. Potato Mag. 2¹: 6–7, 29–30. 6 *fig.* 1919.—Construction of houses is described.—*Donald Folsom.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1898. A. B. R. [Rev. of: VAN TIEGHEM, P. Elements de botanique. [Elements of botany.] 5-éd. 8vo. Tome I, Botanique générale, revue et corrigée par J. Costantin; *xv + 619 p., 260 fig.* Tome II, Botanique speciale, remaniée et augmentée par L. Costantin; *xx + 745 p., 526 fig.* Masson: Paris, 1918.] Jour. Botany 57: 197–198. 1919.

1899. Anonymous. **Agricultural schools and experiment farms.** Official Year Book Union South Africa 2: 448–450. 1919.—There are five agricultural schools and experiment farms in the Union; particulars are given concerning the regular courses, extension work, experimental and research work undertaken at these establishments.—*E. M. Doidge.*

1900. Anonymous [Rev. of: Cook, M. T. **Applied economic botany.** J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Abstr. 3, Entry 491.)] Amer. Bot. 25: 116–117. Aug., 1919.—"One of the first books to indicate an approaching change in the subject matter of plant studies."—*Reviewer.*

1901. Anonymous. **Botanic gardens.** Amer. Bot. 25: 101, 105. 1919.—Credited to "News, Imperial Department Agriculture, B. W. I. [British West Indies]."

1902. Anonymous. [Rev. of: Gruenberg, B. C. **Elementary biology.** *x + 588 p., 281 fig.* Ginn and Co.: Boston, 1919.] Amer. Bot. 25: 115–116. Aug., 1919.—The reviewer is convinced "that a combination of the showy parts of botany and zoology will never be successfully substituted for courses in the sciences named."—*Reviewer.*

1903. Barthe, A. E. **Campitos escolares.** [School gardens.] Revist. Agric. Com. y Trab. 2: 443–453. *6 fig.* 1919.

1904. [Bruckman, Louisa, and C. Stuart Gager.] **Educational conference on biology in New York City high schools.** Brooklyn Bot. Gard. Rec. 8: 95–121. July, 1919.—Report of conference held under auspices of Brooklyn Botanic Garden at the laboratory building, April 4, 1919. Includes remarks by various speakers, principals of New York High Schools, university professors, and others on educational value of botany and general biology in high schools. The associate superintendent of New York City schools was reported to have said that general biology, as a high school subject, did not "function." Majority of speakers contended that biology has demonstrated beyond question that it has value equivalent to any other subject of the high school course from the standpoint of both content and discipline. The occasion of the conference was the movement to introduce into New York City High Schools courses in general science and community civics. This would result in eliminating general biology, at least as a required subject in the first year of the high school.—*C. S. Gager.*

1905. Caldwell, Otis W. **The Gary Public Schools: science teaching.** *viii + 125 p.* The General Education Board: New York, 1919.—One of a series of eight reports, embodying the results of a survey of the Gary (Indiana, U. S. A.) public schools, made by the General Education Board, on invitation of the Board of Education and the Superintendent of Schools of Gary. Gives a detailed account of the theory, equipment, actual practice, and results of the so-called "duplicate" system (Gary system) so far as concerns nature study, school gardens, zoology, and botany. The botany work largely centers around applied topics or "projects," in horticulture and agriculture, with special attention to the botany of cultivated plants. Gives list of "projects," and detailed outline of course in "botany" for seventh and eighth grades. Treats in similar manner of Zoology, Physics, and Chemistry. In the *Conclusion* author states that the pupils were interested, "but they were more than interested—they were being trained to think and act effectively. The teaching of botany and gardening at the Froebel school . . . . kept in close contact with the facts and needs of life. Elsewhere, however, the instruction was too frequently formless and aimless." Author notes a "lack of continuity and of organising purpose. . . . . Gary's science supervision is nominal and its staff conferences far too rare to answer their purpose." Gary has "shown courage and resourcefulness in trying to free science teaching from its remote and abstract character, in trying to bring it into touch with the pupil's experience and to relate it to his other school work;" but "beyond a general and sound predilection for the concrete is embodied in the environment and experience of the pupil, it is impossible to discern at Gary satisfactory principles of organization or progression in science teaching. Unquestionably, the children are interested in their science work and derive pleasure from it, and to this end the work is of

value. But science fulfills its educational mission, not simply by arousing interest in a disconnected series of phenomena . . . . but by cultivating capacity to deal intelligently and vigorously with significant problems. . . . . Unless so presented, science is likely to be a transient diversion rather than a profoundly formative and truly disciplinary influence in the pupil's development.—*C. S. Gager.*

1906. CHAPMAN, H. H. Forestry as a vocation. Amer. Forestry 25: 1075-1077. 1919.

1907. CLAASEN, P. W. The tale of the cat-tail. Nat. Study Rev. 15: 244-246. *3 fig.* Sept., 1919.—Cat-tail fruits furnish home for larvae of moth *Lymnaecia phragmitella.*—*A. Gundersen.*

1908. COCKAYNE, L. Presidential address, New Zealand Institute Science Congress, Christchurch, 1919. New Zealand Jour. Sci. Technol. 2: 241-251. July, 1919.

1909. CONARD, HENRY S. Old and new classification. School. Sci. Math. 19: 592-603. Oct., 1919.—No one would cling to an outworn system merely on grounds of convenience. Urges abandonment of Thallophyta, Bryophyta, Pteridophyta and Spermatophyta classification in favor of a dichotomous one Thallophyta, Embyrophyta, the latter divided into Atracheata and Tracheata, and the last again into Lycopsida and Pteropsida. More fully in March (1919) *Plant World.*—*A. Gundersen.*

1910. DAVIS, BRADLEY M. Introductory courses in botany. School Sci. Math. 19: 629-632. Oct., 1919.—Replies to requests from the Division of Biology, National Research Council, giving three outlines of introductory courses in botany.—*A. Gundersen.*

1911. [GAGER, C. STUART.] Statements of high school principals as to the value of general biology in the high schools of greater New York. Brooklyn Bot. Gard. Rec. 8: 121-126. July, 1919.—Replies to a letter of inquiry sent by author to all New York City high school principals not present at the conference on similar topic held at Brooklyn Botanic Garden, Apr. 4, 1919. Almost unanimous testimony to the superior value of general biology as a subject for high school study.—*C. S. Gager.*

1912. GRIER, N. M. Teaching a "Reading" textbook of botany. School Sci. Math. 19: 723-726. Nov., 1919.—Our science courses must be largely informational for a time. A great deal of microscopical work is far from beneficial. Botany should be the outlet for every other talent of the pupil which can be made to bring to bear on it. The great groups of plants and their subdivisions should not be forgotten. Definite mental pictures must be formed as to what are the algae, fungi, lichens, mosses, ferns, conifers and palms.—*A. Gundersen.*

1913. GRUENBERG, BENJAMIN C. Elementary biology. *x* + *528 p. Fig. 261.* Ginn & Co.: Boston, 1919. [See Bot. Abstr. 3, Entry 1902.]

1914. HAUSMAN, E. H. The common milkweed. Nat. Study Rev. 15: 238-241. *2 fig.* Sept., 1919.—Study of flower and fruit.—*A. Gundersen.*

1915. HOGSTAD, ANTON, JR. The medicinal plant garden and the pharmacist. Northwestern Druggist 27: 389-391. 1919.—The author discusses the development of the medicinal plant garden for commercial purposes by many manufacturing pharmacists and lists 22 schools and colleges that have medicinal plant gardens. He shows that these gardens are a means of very readily acquainting the student of pharmacy with the nature and characteristics of the many drug plants and helps him to retain this knowledge and that they are of inestimable value for purposes of research.—*Oliver Atkins Farwell.*

1916. KARRAKER, P. E. What is the value of the usual laboratory work given in general soil courses? Jour. Amer. Soc. Agron. 2: 253-256. 1919.

1917. Kjjerskog-Agersborg, H. P. **The teaching of natural science in the primary and secondary schools of Norway.** School. and Soc. 9: 673–678. 1919. Abstr. in Brooklyn Bot. Gard. Rec. 8: 147–148. Oct., 1919.—Nature study includes botany, zoology, human physiology and hygiene, geography, physics and chemistry. It is taught through each year of the primary school, middle school, and gymnasium and is studied by all pupils. The place, time, and point of view for each of these sciences is given, together with a tabular presentation of the science curricula of the primary and middle schools.—Botany is introduced in the fifth year of the primary school and continues two years. The point of view is generally economic and physiological. In the middle school emphasis is placed upon the classification and life histories of seed plants. Not until the student has reached the gymnasium is biology presented from an evolutionary point of view. Both botany and zoology are presented as laboratory and lecture courses. All students in the gymnasium get some biology, but students in science courses get about twice as much as others.—This training results in the production of a common body of scientific knowledge in the community, and in a high degree of appreciation for natural science.—*W. L. Eikenberry.*

1918. Lange, D. **Mysteries and revelations of the plant world.** Amer. Forestry 25: 1273–1280. *14 fig.* 1919.—Popular.—*Chas. H. Otis.*

1919. Lanter, Adelaide. **Como se prepara un herbario.** [Preparing an herbarium.] Revist. Agric. Com. y Trab. 2: 454. *1 fig.* 1919.

1920. Martin, John N. **Botany for agricultural students.** *16 × 24 cm., x + 585 p., 188 fig.* John Wiley & Sons, Inc.: New York, 1919.—See Bot. Abstr. 3, Entry 2165.

1921. McWilliams, C. K. **The agricultural short course in the high school.** School Sci. Math. 19: 614–618. 1919.—In 1860 one-sixth of United States population resided in towns, in 1910 45 per cent lived in cities. As rural population decreases, more machinery is necessary to perform farming operations, demanding more training. Three million farm laborers with an additional million just starting life on farms should be reached through winter short courses. Course in Geneseo Township High School includes soils and crops, horticulture, general science, English; farm mechanics, farm carpentry, general science, English; animal husbandry, farm arithmetic, community civics, English; farm management, business methods, farm accounting, English. Books dealing with specific subjects are preferable to texts on general agriculture.—*A. Gundersen.*

1922. Meyer, Frank B. **The appeal that trees make as memorials.** Gard. Chron. Amer. 23: 166–167. *2 fig.* 1919.

1923. Munz, P. A. **The acacia.** Nat. Study Rev. 15: 233–237. *3 fig.* Sept., 1919.—Species grown in California.—*A. Gundersen.*

1924. Rusby, H. H. **The New York Botanical Garden.** Pharm. Era 52: 197–200. *5 fig.* 1919.—The gardon contains nearly 400 acres at the upper end of Bronx Park. The physical features of the Garden are described in general terms but the principal theme of this paper is the Economic Garden and the Economic Museum. Typical representatives of the various classes are grown in the garden. The economic specimens occupy the entire ground floor of the Museum; here are kept the drug specimens. Whenever possible these have been properly authenticated by competent botanists, collectors and herbarium specimens from the plant yielding the product. The figures illustrate a view of the Garden, a plan of the Economic Museum, the cases, and the style of label used. The western half of the upper floor contains the experimental and research laboratories, the eastern half the Garden herbarium and that of Columbia University, which together number more than a million and a half specimens. The building also houses a library of over 29,000 bound volumes and all current botanical periodicals. Thousands upon thousands of city children make their first acquaintance with cultivated crops at the New York Botanical Garden.—*O. A. Farwell.*

1925. SAMPSON, ARTHUR W. **Suggestions for instruction in range management.** Jour. Forestry 17: 523-545. 1919.—See Bot. Abstr. 3, Entry 2052.

1926. SHINN, HAROLD B. [Rev. of: HODGE, C. F., AND JEAN DAWSON. **Civic biology** *321 p. 166 fig.* Ginn & Co.: Boston, 1918.] Plant World 21: 261-262. Oct., 1918.

1927. TRAVER, JAY. **How mother nature sows her seeds.** Nat. Study Rev. 15: 247-259. *9 fig.* Sept., 1919.—Autumn is the time to study seed dispersion, which occurs: (1) by elastic tissues (oraneshill, jewel-weed, violet, wisteria, witch-hazel, squirting cucumber, salvia); (2) by water (water lily, cocoanut palm, dock, arrowhead, bladdernut, lyme grass); (3) by wind (ash, elm, maple, linden, pine, milkweed, poplar, dandelion, smoke tree, clematis, button wood, tumble weeds, small seeded fruits); (4) by animals (beggar's ticks, tick trefoil, cocklebur, hurdock, avens, nuts, berries, etc., seeds carried by ants, by water birds, and man).—*A. Gundersen.*

1928. VINAL, W. G. **Mainly the pedagogy of seeds with some seeds of pedagogy.** Nat. Study Rev. 15: 213-232 *2 pl.* 1919.—Describes suggestive exercise with drawing of burmarigold seeds. Adaptations of dandelion. In study of seeds, seed coat, seed scar, seed leaf, seed stem, seed bud and doorway (for micropyle) are suggested as simple names. Seedlings should be grown. Study of seed dispersal by wind, animals, mechanical contrivances and water.—*A. Gundersen.*

1929. WELLS, B. W. **Botany laboratory guide for elementary and general botany courses.** *13 × 18 cm. 40 p.* Published by the author: Fayetteville, Arkansas, 1918.

CYTOLOGY

GILBERT M. SMITH, *Editor*

1930. ALVARADO, SALUSTIO. **Sobra al verdadero significado del "sistema de fibrillas conductor de las excitaciones en las plantas" de Nemec. (Un dato para la historia del condrioma vegetal.)** [True significance of Nemec's system of filaments for conducting stimuli in plants.] Bol. R. Soc. Española Hist. Nat. 19: 147-152. *2 fig.* 1919.—The author reviews Nemec's article (Die Reizleitung und die reizleitenden Strukturen bei den Pflanzen, 1901) and points out that the structures described and figured by Nemec are manifestly similar to the mitochondrial apparatus of vegetable cells discovered in *Nymphoea alba* by Meves three years later. Nemec was able to obtain coloration of the filaments in his preparations of various roots only for a very brief period immediately before death of the tissue and, according to Guilliermond, this is true of the mitochondrial filaments also. The best observations of the filaments were made from material fixed and stained almost exactly the same as the material with which Meves later worked. Nemec observed the filaments particularly in the periblem, and to some extent in plerome of rootlets of various plants, but almost never in the exterior part of the periblem, the hypodermis, or the dermatogen. The filaments most clearly appeared in those meristematic cells which are not dividing but are energetically enlarging and have large vacuoles, the filaments there running in the longitudinal protoplasmatic trabeculae and describing curves and loops and often closely approaching the nucleus. Alvarado points out that this corresponds closely with the evolution of chondriomes in the root tips of beans or chick-peas proximal to the growing point; first granules or short rods, then in young cells of the pleroma transforming into chondriomes each time larger, until at the stage when Nemec observed his filaments, the mitochondrial filaments are to be found following the trabeculae, curving or looping, and some of them passing near the nucleus. The sheath of Nemec's filaments is no doubt the tonoplast which is to be seen at times either near the mitochondria, the plastids, or the starch grains. Nemec subjected plants studied to diverse agents in order to observe action of external conditions on the fibers, and the results are similar to those obtained by authors who, like Guilliermond, have experimented on the chondriosomes: in plasmolysis the filaments break up and finally disappear. The author believes that he has demonstrated Nemec's filaments to be chondriosomes and that the claim that they are conductive filaments is thus invalidated.—*O. E. Jennings.*

1931. Alvarado, Salustio. **La fina estructura de los vasos leñosos (Nota previo). [Minute structure of wood vessels.]** Bol. R. Soc. Española Hist. Nat. 19: 66–75. 7 *fig.* 1919.—See Bot. Abstr. 3, Entry 1567.

1932. Bailey, Irving W. **Phenomena of cell division in the cambium or arborescent gymnosperms and their cytological significance.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 283–285. July, 1919.—Growth and cell division in the cambium of woody plants seem to have been little studied by other workers, probably because of the difficulty of sectioning. This paper reports cytological phenomena observed in *Pinus Strobus*, the species with which the writer's methods were perfected. The very long and slender cambium cells are uninucleate. In "normal longitudinal divisions" the spindle is placed diagonally in the cell, and the mitotic figure is asymmetrical. After nuclear division the spindle is extended lengthwise of the cell by the addition of peripheral fibers, while the central fibers disappear and are replaced by the cell plate. Thus two separate masses of fibers are formed, designated *kinoplasmasomes*. These kinoplasmasomes gradually recede to the ends of the mother cell, which is then longitudinally bisected by the cell plate. During the formation of the cell plate the daughter nuclei remain near the center of the mother cell.—*H. B. Frost.*

1933. Digby, L. **On the archesporial and meiotic mitoses of Osmunda.** Ann. Botany 33: 135–172. *Pl. 8–12.* 1919.—Several species, but principally *Osmunda palustris*, were used for this work. Fixing was done on warm days, about noon, and the material was plunged into 30 per cent alcohol at 30°C. for a few seconds before placing it in the fixing fluid. Most of the illustrations are from material fixed in strong Flemming solution.—Considerable attention is given to the archesporial mitoses, especially the last sporogenous mitosis, immediately preceding the reduction divisions, and all these mitoses were found to have the general character of vegetative divisions. A diagrammatic scheme, in color, makes it easy to understand Miss Digby's interpretation. Each univalent chromosome has a dual nature which persists throughout chromosome dissolution and reconstruction. Longitudinal fission occurs in late anaphase. The parallel threads, seen in telophase of the last sporogenous mitosis, are identical with the parallel threads seen in prophase of the heterotypic mitosis. During synapsis these parallel threads become closely associated and emerge from synapsis as a univalent filament, but there may be a space in its substance, marking the line along which fission will occur as the chromosomes separate during the homotypic mitosis. Segments of the univalent filament become associated in pairs, and the two members of each pair are separated in the heterotypic mitosis. The homotypic mitosis simply separates the two longitudinally associated parts of each member of the pair, the splitting or fission of the chromosomes being merely the reappearance of the fission which was seen in the daughter chromosomes of the heterotypic telophase.—*Charles J. Chamberlain.*

1934. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. 6: 273–300. 1919.—Author brings together, from cytology, colloid chemistry and genetics, data which bear on the problem of the chemical and physical characteristics of protoplasm. Emphasizes importance of the cell theory.—Modern cytology recognizes the existence of localized spatially differentiated regions of the cell body (such as plastids) in which physiological processes take place. It has given up the old "corpuscular" theories of the structure of protoplasm, though these are still suggested by the modern discussions of chondriosomes and mitochondria. Chromosomes have received intensive study and their importance in heredity has been established, although we still know little about their structure or the means whereby they control the process of development.—Following a recognition and study of the colloidal state of matter, the earlier and cruder theories of the chemistry of protoplasm have been superseded by the conception of the cell as a polyphase colloidal system, a conception which is in harmony with many of the observed facts of cytology. It fails, however, to explain polarity, a conspicuous characteristic of the living cell.—Evidence from genetics, and particularly from the Mendelian hypothesis of unit factors, and the conception of the chromosomes as "so many chains of factorial beads," tends to suggest the old and now refuted idea of spatial configuration in

the germ plasm. Author believes that "the structure of protoplasm is the structure of the cell as an organised system and itself the unit in all the complex interactions by which the egg develops into the specialised and differentiated many-celled organism." [See Bot. Absts. 3, Entry 2133.]—*E. W. Sinnott.*

1935. HIBINO, S. [Rev. of: HEUSSER, K. Neue vergleichende Permeabilitätsmessungen zur Kenntnisse der osmotischen Verhältnisse der Pflanzenzelle in kranken Zustande. (New comparative measurements of permeability to ascertain the osmotic relations of diseased plant cells.) Vierteljahrsschr. Naturforsch. Ges. Zürich 62: 565–589. 1917.] Bot. Mag. Tôkyô 33: 135–138. 1919.

1936. HIBINO, S. [Rev. of: TRONOLE, A. Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten. (The influence of light on the permeability of the plasma-membrane, and the method of permeability coefficients.) Vierteljahrsschr. Naturforsch. Ges. Zürich 63: 187–213. 1918.] Bot. Mag. Tôkyô 33: 138–140. 1919.

1937. HURD, ANNIE MAY. Some orienting effects of lights of equal intensities on Fucus spores and rhizoids. Proc. Nation. Acad. Sci. [U. S. A.] 5: 201–206. *1 table.* June, 1919.—See Bot. Absts. 3, Entry 2909.

1938. KIHARA, HITOSHI. Über cytologische Studien bei einigen Getreidearten. [Cytological studies of some cereal crosses.] Bot. Mag. Tôkyô 33: 21–38. *21 fig.* 1919.—See Bot. Absts. 2, Entry 946; 4, Entry 627.

1939. KIHARA, HITOSHI. Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftverhältnisse unter Avena-arten. [Cytological Studies in the Cereals. II. Chomosome counts in reference to the relationship of oat species.] Bot. Mag. Tôkyô 33: 94–97. *2 fig.* 1919.—The following counts were obtained from root tips and pollen mother-cells: (1) 7–14 chromosome form, *Avena strigosa;* (2) 14–28 chromosome form, *A. barbata;* (3) 21–42 chromosome forms, *A. fatua, A. sativa, A. sterilis, A. byzantina,* and *A. algeriensis.* He holds that these results are not inconsistent with the classification proposed in 1914 by Zade based on the results of serum experimentation.—*Leonas L. Burlingame.*

1940. LYNCH, VERNON. The function of the nucleus of the living cell. Amer. Jour. Physiol. 48: 258–283. 1919.

1941. MOREAU, FERNAND. Une anomalie dans l'histoire nucléaire des spores de l'Endophyllum Sempervivi Lév. [An anomaly in the nuclear division of spores of Endophyllum Sempervivi.] Bull. Trimest. Soc. Mycolog. France 35: 98–101. *1 fig.* 1919.—The author states that the origin of binucleated spores among the Uredinales is generally attributed to the fusion of uninucleated cells just below the aecium. Quite different however is the origin of four-nucleate spores, which the author observed in *Endophyllum Sempervivi.* In *Endophyllum* it is not the cellular fusion which brings about four-nucleate cells, for the spores containing four nuclei are not seen at the base. The young spores contain only two nuclei. The nuclear division takes place within the older spores, forming spores with four nuclei. Two of the four nuclei degenerate immediately, leaving two large nuclei which fuse within the older spores. Occasionally the author observed some terminal spores containing six nuclei, attributed to the division of two nuclei of a primitive four-nucleate spore. The nuclear divisions have the characteristics of the karyokinetic division of the Uredinales.—*Fred C. Werkenthin.*

1942. TWISS, W. C. A study of plastids and mitochondria in Preissia and corn. Amer. Jour. Bot. 6: 217–234. *Pl. 33–34.* 1919.—A review of the more important literature on mitochondria and their relation to plastids is presented, together with observations on these structures in *Zea Mays* and *Preissia commutata.* The author obtained best results with Benda's method for fixing and staining, which is outlined in detail. In the root tips of corn,

undoubted mitochondria are abundant in the embryonic region, plastids are abundant farther back, and between the two are bodies apparently intermediate in character. Evidence is presented that at least some of the "oil bodies" or "elaioplasts" of Preissia are true plastids. Mitochondria are also present in this genus in the growing region of the disc, and are apparently related to certain of the oil bodies in the mature cells. The author believes that mitochondria exist and are normal constituents of the cytoplasm, but regards evidence as to their division and their function in heredity as inadequate. The mitochondrial origin of chloroplasts is discussed, but author takes no definite position thereon.—*E. W. Sinnott.*

1943. YAMAHA. [Rev. of: WEATHERWAX, P. **Gametogenesis and fecundation in Zea mays as the basis of Xenia and heredity in the endosperm.** Bull. Torrey Bot. Club. 46: 73-90. 1919. See Bot. Absts. 2, Entry 717.] Bot. Mag. Tôkyô 33: 165–166. 1919.

ECOLOGY

H. C. COWLES, Editor

1944. ANDREWS, E. F. **The Japanese honeysuckle in the United States.** Torreya 19: 37–43. *2 fig.* 1919.—*Lonicera japonica* Thunb., until recently known in this country only as a cultivated plant, has escaped widely in the eastern United States, especially in the South, its range extending from Texas to Massachusetts. It spreads very rapidly by runners, and smothers out other vegetation. Under these conditions it rarely flowers, but propagates chiefly by vegetative means.—*J. C. Nelson.*

1945. ARBER, AGNES. **Aquatic angiosperms: The significance of their systematic distribution.** Jour. Bot. 57: 83–86. Apr., 1919.—See Bot. Absts. 3, Entry 733.

1946. BÄR, JOH. **Die Vegetation des Val Onsernone (Kanton Tessin).** [**The vegetation of the Val Onsernone (Canton Tessin).**] Ber. Schweiz. Bot. Ges. No. 26. *80 p. 1 map.* June, 1918.—A detailed account of the distribution of vegetation in the drainage basin of the Isorno, Kanton Tessin, Switzerland. The area approximates 113 square kilometers and is characterized by very rugged relief, being surrounded by mountain chains ranging above 2000 meters. Throughout the region ravines are so numerous as to leave very few flat areas of any considerable size. Precipitation is high, averaging about 80 inches and the greatest rainfall occurs during the season of vegetative activity. The climate in general is decidedly "Insubrian." The altitudinal distribution on northern slopes shows the following zonation: chestnut 250–900 meters; beech 900–1100 meters; silver fir 1100–1800 meters; spruce 1600–1700 meters; larch 1700–2000 meters. On southern slopes the zonation shows an upward advance: chestnut 250–1050 meters; beech 1050–1750 meters; larch 1750–2100 meters. Certain species of oak, linden, birch and alder form distinct stands depending mainly on local climatic and edaphic factors. Aside from the forest types the author describes the distribution and composition of the deciduous and coniferous scrub types; the meadow and heath types; the swamp, moor and freshwater types; and the ruderal vegetation which is well developed in spite of the barriers that tend to exclude it. [Unsigned full rev. in Jour. Ecol. 6: 235–239. 1918; unsigned rev. in Nature 102: 243. 1918; rev. by TUBEUF in Nat. Zeit. Forst. Landw. 16: 358–359. 1918.]—*P. D. Strausbaugh.*

1947. BENNETT, ARTHUR. **Potamogeton acutifolius Link.** Jour. Botany 57: 101. 1919. On p. 17 of the same volume of this journal lat. 60° 12′ n. was given as the northern limit of this species. A specimen is now reported from lat. 62° 30′ n. in Finland.—*K. M. Wiegand.*

1948. BOWMAN, H. H. M. **Botanical ecology of the Dry Tortugas.** Carnegie Inst. Wash. Publ. 252: 109–138. *6 pl., 7 fig.* 1918.—The flora of these eight small coral islands is essentially a strand flora determined by the uniformly xerophytic conditions which prevail. In this flora four fairly distinct associations are recognized: (1) the Uniola community; (2) the Suriana community; (3) the Opuntia community; and (4) the Chamaesyce community.

The content and distribution of these four associations are discussed, each island being considered separately. Constant reference is made to the notes of Lansing's survey made in 1904 with a view to pointing out changes in the general flora of the region which have occurred in the twelve intervening years, and possible reasons for such changes are suggested.—*P. D. Strausbaugh.*

1949. BRAUN-BLANQUET, JOSIAS. **Eine pflanzengeographische Excursion durchs Unterengadin und in dem schweizerischan National park. [A phytogeographic excursion through the Lower Engadine and in the Swiss National Park.]** Ber. Schweiz. Bot. Ges. 26. *79 p., 1 map.* March, 1918.—An account of a series of ecological excursions conducted under the auspices of the Schweiserischen Naturforschenden Gesellschaft through portions of eastern Switzerland in early August, 1916. The vegetation encountered is described in detail from the standpoint of climatic, physiographic and edaphic relations. An ecological classification, and complete list of the plants are given for each separate region in which studies were made. —*P. D. Strausbaugh.*

1950. BROCKMANN-JEROSCH, H. **Das Lauben und sein Einfluss auf die Vegetation der Schweiz. [Leaf-stripping and its influence on the vegetation of Switzerland.]** Jahresber. Geogr. Ethnogr. Ges. Zürich. *20 p., 4 fig.* May, 1918.—In central Europe there are many districts such as the Val Onsernone in which the leaves and twigs of trees are used to provide food for the cattle, sheep, goats and even hogs during the winter season. The foliage and young twigs are cut, dried and stored during the summer, and also the fallen leaves may be gathered. Elm, ash, oak, linden and white fir furnish the greater part of this sort of "fodder," although juniper needles and the leaves of fruit trees are also used. This practice is a relict of a much more widely spread custom that prevailed in earlier times. It has left its impress upon the character of the vegetation in the peculiar forms of the trees as a result of the periodical removal of the younger parts, and also in the distribution of the trees as largely determined by man's protection, selection and planting. In places the practice has been almost completely abandoned and hay has been substituted for tree foliage as food. This change has led to the building up of rich meadows through the application of artificial fertilizers, and accounts for the origin and existence of such meadows in central Europe. Naturally, such grassland areas would pass directly into forest formation but owing to the dense stand of the grasses and the annual cutting with scythes, the invading tree species are entirely suppressed.—*P. D. Strausbaug.*

1951. CHURCH, A. H. **Weighing moorings.** Jour. Botany 57: 35-37. 1919.—The insecurity of sand, gravel and rock fragments as an anchorage for maritime algae is pointed out, as influenced by the lifting force of the specific gravity of the water especially under wave action, and also by the lifting force of the bladder-bearing seaweeds. When insecure, the moorings may be weighed, and the whole drift out to sea, or in shore. Germinating zoospores of *Enteromorpha*, each attached to a particle of sand, may be floated off by the incoming tide, each supported by its bubble of oxygen. *Calpomenia sinuosa*, a Mediterranean Phaeosporean, appeared in the Gulf of Morbihan in 1906, attached to oysters. The thallus, filled with photosynthetic gas bubbles, acted as a float, floating the oysters out to sea; and was thus a menace to the oyster industry. The amount of sea weed thrown on the shore is probably only a small part of that floated out to sea and lost. Experiments by MR. SPENCE on the lifting of stones by Laminarias are outlined, and the results stated; also the lifting power of a giant *Macrocystis* is speculated upon.—*K. M. Wiegand.*

1952. COWLES, HENRY C. **Starved Rock State Park and its environs. Part III. Botany.** Bull. Geog. Soc. Chicago 6: 129–148. *3 fig.* 1918.—The flora of the State Park is discussed under four separate heads: (1) the oak forest uplands; (2) the canyons; (3) the river bluffs; and (4) the bottom lands. The oak forest is confined to the upland margins and consists principally of *Quercus alba* and *Q. rubra*. *Q. macrocarpa* is the dominant oak of the margin next to the prairie, and *Q. velutina* occupies the drier places. Owing to excessive pasturing,

the natural undergrowth has been practically destroyed.—The canyons are the centers of scenic interest; they are characterized by great diversity of plant life and the presence of many rare species. A half dozen liverworts and twice as many species of ferns make up a very interesting portion of the plant population.—The river bluffs present the opposite of living conditions noted in the canyons. In the latter shade and moisture are prevalent while in the former full exposure to sun and wind results in a habitat suited only to such plants as are found in dry areas. However, certain plants found commonly in bogs and swamps are present here, owing to the fact that absorption of water in these exposed situations is no more difficult than it is under bog conditions.—The fertility of the bottom lands has made them very desirable for agricultural purposes so that in large part the natural vegetation has disappeared. Only on flood plain margins and on the river islands can an idea of the richness of this natural vegetation be obtained.—The author concludes with a brief account of the history of the flora, and an analysis of the changes that are in progress at the present time.—*P. D. Strausbaugh.*

1953. De Vries, Hugo. **The relative age of endemic species.** Science 47: 629–630. June, 1918.—De Vries reasserts his belief in the validity of the age-and-area hypothesis of Willis, concluding that "in every systematic group of plants the rule prevails that the most widespread species are the oldest, whereas the others are younger, the smaller their area is."—*P. D. Strausbaugh.*

1954. Dorsey, M. J. **Adaptation in relation to hardiness.** Minn. Hortic. 46: 465–469. *1 fig.* 1918.—Certain data bearing on the relation of the maturation period to hardiness are presented. There is an essential difference between a variety and a species in respect to growth response as a result of adaptation to environment. The author says, "it would be expected, however, that the same forces operating to produce differences in a species would do the same in time with variations arising within a variety."—*P. D. Strausbaugh.*

1955. Du Rietz, G. E. Th. C. E. Fries, and T. A. Tengwall. **Vorschlag zur Nomenklatur der soziologischen Pflanzengeographie.** [Nomenclature in sociological plant geography.] Svensk. Bot. Tidskr. 12: 145–170. 1918.—A discussion of phytogeographical classification including descriptions, examples and definitions of the terms used, such as formation, association, facies, aspect, etc. Emphasis is placed upon the need for a clearer and more unified nomenclature in the literature dealing with phytogeographical classification.—*P. D. Strausbaugh.*

1956. Emig, W. H. **The travertine deposits of the Arbuckle Mountains, Oklahoma, with reference to the plant agencies concerned in their formation.** Oklahoma Geol. Surv. Bull. 29. *76 p. 28 fig. 2 pl., 2 maps, 1 table.* 1918.—The travertine forms several waterfalls in creeks in the Arbuckle Mountains, in the semi-arid southwestern part of the state, and algae and mosses have played an important part in its deposition. [See also Bot. Abstr. 2, Entry 222.] —*Roland M. Harper.*

1957. Ferguson, William C. **Plants in flower in the autumn of 1918 on Long Island, N. Y.** Torreya 19: 12–13. 1919.—The autumn of 1918 was warmer than any previously observed in this vicinity. A list is given of 16 species in fresh bloom at Garden City, L. I., on Oct. 28–30, 1918, and a second list of 50 species collected between Pine Lawn and Lake Ronkonkoma on Nov. 1–2.—*J. C. Nelson.*

1958. Gleason, Henry A. **On the development of two plant associations of northern Michigan.** Plant World 21: 151–158. June, 1918.—Describes successional stages in the cleared maple-beech forests and in abandoned fields in same region. Tables show frequency indices of all plants in quadrats studied at two and three year intervals. The principal species in clearings are *Acer pennsylvanicum, Sambucus racemosa* and *Rubus idaeus.* The maples require five years to reëstablish their dominance. The dominant plant in abandoned fields is *Poa pratensis.*—*Forrest Shreve.*

1959. GRAY, JOHN, AND GEORGE J. PEIRCE. **The influence of light upon the action of stomata and its relation to the transpiration of certain grains.** Amer. Jour. Bot. 6: 131–135. *13 fig.* 1919.—See Bot. Abstr. 3, Entry 436.

1960. GRIGGS, ROBERT F. **Asclepiadora viridis in Ohio.** Ohio. Jour. Sci. 19: 299. 1919. —The occurrence of *Asclepiadora viridis* in the Sugar Grove area is a notable extension of the range of this southern plant.—*H. D. Hooker, Jr.*

1961. GRIGGS, R. F. **Scientific results of the Katmai expeditions of the National Geographic Society. IV. The character of the eruption as indicated by its effects on nearby vegetation.** Ohio Jour. Sci. 19: 173–209. 1919. The eruption of Katmai in 1912 destroyed the surrounding vegetation by acid rains, ashfall, hot blasts, mud flows and fires. All life was annihilated over an area of 140 square miles. The condition and reactions are described and illustrated by photographs. Plants that lay buried for 3 years came up from the old roots in 1915, when the ash was removed by a flood. The cause of dormancy is discussed. [See also next following Entry, 1962.]—*Henry D. Hooker, Jr.*

1962. GRIGGS, ROBERT F. **Scientific results of the Katmai expeditions of the National Geographic Society. IX. The beginnings of revegetation in Katmai Valley.** Ohio Jour. Sci. 19: 318–342. 1919.—The first stages of revegetation in the valley of Katmai River are described. The agents of revegetation are: (a) surviving woody plants, chiefly the larger willows, that protrude through the ash; (b) herbage in places cleared of ash, consisting of *Elymus arenarius* and *Equisetum arvense;* and (c) seedlings of lupines, willows and the grasses, *Deschampsia caespitosa* and *Calamagrostis langsdorfii*. The more important factors determining distribution seem to be the concentration of requisite salts, high wind velocity and shifting streams. The essential problem of revegetation is the nitrogen supply. [See also next preceding Entry, 1961.]—*H. D. Hooker, Jr.*

1963. GRUBER, C. L. **Fragrant wildflowers.** Amer. Bot. 25: 8–13. 1919.—A list of 125 fragrant species from Pennsylvania is given and an attempt is made to indicate the amount of fragrance of each.—*W. N. Clute.*

1964. HARSHBERGER, J. W. **Alpine fell-fields of eastern North America.** Geog. Rev. 7: 233–255. *12 fig.* Apr., 1919.—The fell-fields (a European term for rocky areas with sparse vegetation in cold climates) described and illustrated are on the higher mountains of New England and New York. Comparisons are made with similar areas in other parts of the world. The author believes it is important to correlate in similar fashion the related plant formations of different regions.—*Roland M. Harper.*

1965. HITCHCOCK, A. S. **A botanical trip to Mexico.** Sci. Monthly 8: 129–145, 216–238. *34 fig., 6 maps.* 1919.—The article is illustrated with views of Mexican scenery, life and plants. It is a brief summary of observations made in connection with a trip in the summer of 1910. The technical report upon the grasses is published as Contr. U. S. Nat. Herb. 17: 181–189. 1913. A small map with 500-meter contour interval indicates the greater topographic features, a plateau 3000–8000 feet in altitude with a strip of lowland along each coast. Other maps give the annual and monthly rainfall.—Northern Mexico is arid, the rainfall being less than 10 inches (25 mm.). The precipitation increases towards the south. The maximum, 114 inches (2867 mm.), is at Córdoba.—A map giving the location of the 37 collections, shows them to be widely distributed, with the larger number of places in the region from Córdoba to Mexico City. A few places are south of this area and many are north, extending almost as far as El Paso, Texas. A table is given listing the collections by locality, state, altitude, date, and field numbers of the specimens.—The second part of the paper discusses the common wild grasses of Mexico. It is suggested that the ecologist will readily coordinate the flora upon the basis of the grasses. Thirteen species are listed for the eastern coastal plain and six for the western. These coastal plains grasses are of no particular agricultural importance, except those on the sandy flats around Vera Cruz. The plateau furnished a much larger

number of species, only the more conspicuous sorts being mentioned, some 20 species in all. Habitat and plant are listed with a brief descriptive phrase. It is noted that specimens collected at Manzanillo in the same habitat as those collected by Humboldt and Bonpland at Acapulco a short distance to the south, correspond perfectly to the original description and plate. Guadalajara is another locality furnishing type specimens of these early travelers. Other collectors and collections are mentioned. One new genus and 22 new species are reported from this trip.—*Lulu Pace.*

1966. Jennings, O. E. **Potamogeton Vaseyi in northeastern Ohio.** Ohio Jour. Sci. 19: 343. 1919.—*Potamogeton Vaseyi* has been collected at Brady's Lake, Portage Co., and at Cowles Creek, near Geneva-on-the-Lake, Ashtabula Co.—*H. D. Hooker, Jr.*

1967. Killip, Ellsworth P. **Fern hunting in Panama.** Amer. Fern Jour. 9: 5–17. 1919. —The article is a general description of the fern flora of the Isthmus of Panama. In addition to the three or four hundred different species of ferns, a number of which are new, the author collected grasses and flowering plants.—*F. C. Anderson.*

1968. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. 11: 143–162. *2 fig.* 1919.—From the results of these studies it is seen that wheat flowers do not universally bloom early in the morning. Experiments were conducted at the Minnesota Agric. Exp. Sta. and at Arlington, Va. The time of blooming of 2977 wheat flowers in 69 heads were recorded. Of these 1492 bloomed at night, and 1485 during the day. Of those blooming during the day 764 bloomed before noon and 721 in the afternoon. Two daily periods of extensive blooming were determined, one from 7 to 9 in the morning and the other about the middle of the afternoon. It was found necessary to protect emasculated flowers in order to prevent undesired pollination. [See Bot. Absts. 3, Entry 2161.]—*J. J. Skinner.*

1969. Lewis, I. F. **The vegetation of Shackleford Bank [Carteret Co., North Carolina].** North Carolina Geol. Surv., Econ. Paper 46. *52 p. 11 pl.* 1918.—Shackleford Bank is a barrier beach similar in general features to many others along the coast of the southeastern United States. The soils and climate are briefly discussed, and the vegetation is divided into several formations and associations. There is a brief description of Bogue Bank (the next beach on the west), a few pages of suggestions for checking the drifting of the sand, and a discussion of the geographical affinities of the flora. Over 200 species are listed, and their habitats indicated by symbols.—*Roland M. Harper.*

1970. Markle, M. S. **A comparison of the plant succession on Hudson River limestone with that on Niagara limestone near Richmond, Indiana.** Proc. Ind. Acad. Sci. 1917: 109–113. 1918.—The Hudson River limestone is softer than the Niagara limestone and contains varying amounts of shale. Owing to this difference in physical character, the plant succession on these two kinds of rocks is strikingly different. On the Hudson River limestone the succession is much more rapid and lichens are not found in the pioneer association.—*P. D. Strausbaugh.*

1971. Nichols, G. E. **Raised bogs in eastern Maine.** Geog. Rev. 7: 159–167. *2 fig.* Mar., 1919.—Bogs of this type are in the United States chiefly confined to southeastern Maine and they occur also in New Brunswick and Cape Breton. They are in a region of boreal coniferous forests, and they are by no means universal even in the regions of their greatest abundance, many flat bogs also occurring near by. They are distinguished by their convex surface, the centers being sometimes 10 feet higher than the edges. *Sphagnum papillosum* is a characteristic plant.—*Roland M. Harper.*

1972. Oliver, F. W., in Carey, Alfred E., and F. W. Oliver. **Tidal lands: a study of shore problems.** *377 p. 89 pl., 54 fig.* Blackie & Son Limited: London, 1918.—A presentation of certain problems which concern the maritime engineer, including extensive studies

of the coastal vegetation and its relation to shore phenomena in general. The United Kingdom's coast foreshore at high-water line is approximately 8000 miles long and the river frontage extends for nearly 12,000 miles. These figures indicate something of the importance of the reclamation problem where the total acreage between high- and low-water mark approaches 800,000 acres. Plants are dealt with principally as important factors from an engineering point of view, their mechanical value depending upon their capacity for reducing the mobility of the sub-stratum together with their tendency to enhance accretion. "It is the power which plants have of organising and retaining ground which gives them value in this connection, and makes it desirable to ascertain in detail the part which each species of plant plays in its own particular zone. For, armed with this knowledge, it becomes possible by artificially introducing a given species at the appropriate moment to hasten the passage of one phase into the next, and thus promote accretion without pauses or delays. Should this practice be adopted we should look forward to a time when, by vegetation methods, combined with temporary engineering constructions for protection from scour and the control of currents, tidal lands would mature for final reclamation not only more rapidly than is at present the case, but also in topographical distribution conveniently for the purpose." The rôle of plants in stabilising dunes and shingle beaches, and in the reclamation of salt marshes is discussed in detail. The most efficient plants are listed and the features which enable them to establish and maintain successful growth in their respective habitats are pointed out and carefully described. The book includes one of the best discussions of the salt marsh that can be found anywhere in the English language.—*P. D. Strausbaugh.*

1973. RAMALEY, FRANCIS. Notes on dune vegetation at San Francisco, California. Plant World 21: 191–201. *4 fig.* Aug., 1918.—Describes dunes along the coast of the Pacific immediately south of the Golden Gate. Large areas are without plants. The leading pioneers are *Franseria chamissonis* and *Abronia latifolia*. Low shrubby plants predominate and annuals and introduced plants are few. The associations of low, of exposed, and of sheltered situations are described. A list is given of 48 species found on the dunes.—*Forrest Shreve.*

1974. RAMALEY, FRANCIS. The rôle of sedges in some Colorado plant communities. Amer. Jour. Bot. 6: 120–130. *2 fig.* 1919.—A study of the part played by sedges in the plant communities of northern Colorado. 8 genera of the Cyperaceae are considered, but the bulk of the paper is devoted to *Carex*, 44 species being listed and classified ecologically. The plant associations in which the genus is important are discussed. Most sedges are either aquatic or marsh plants, or are xerophytes; and usually belong to earlier stages of succession. As mesophytism is approached from either direction, sedges tend to be displaced by grasses and dicotyledons.—*E. W. Sinnott.*

1975. RAMALEY, FRANCIS. Xerophytic grasslands at different altitudes in Colorado. Bull. Torrey Bot. Club 46: 37–52. *2 fig.* 1919.—The aim of the writer is to report the ecological and floristic differences existing between the xerophytic grasslands at different altitudes in Colorado. A synopsis is made of the associations, environmental influences are recorded, a systematic list of species is given, and the floristic differences at different altitudes are discussed.—*P. A. Munz.*

1976. RIGG, GEORGE B. Early stages in bog succession. Publ. Puget Sound Biol. Sta. 2: 195–210. *Pl. 2.* March, 1919.—*Sphagnum* grows on drained as well as undrained areas. It forms no peat on well drained soil, but in moderately drained situations it forms peat slowly. It may form a peat bog by beginning as hummocks on poorly drained prairie; by advancing upon ordinary swamps among or upon sedges and rushes; or by filling lakes from the margin. In encroaching upon shallow water it may advance alone; on deep water it may advance over woody bog plants.—*T. C. Frye.*

1977. SALISBURY, E. J. The ecology of scrub in Hertfordshire: a study in colonization. Trans. Herts. Nat. Hist. Soc. 17: 53–64. 1918.—Two types, woodland-scrub and thicket-scrub, are distinguished, the former being comparatively open and embracing many species

of woody plants including seedling trees, the latter being a closed association with few species and almost no trees. Characteristic shrubs of the thicket type are Ulex, *Prunus spinosa* and Crataegus. The herbaceous flora of the woodland-scrub is abundant but that of the thicket scanty and confined to the margin. Lists of species from different stages of transitions from scrub to forest are given and the relations of the associations to natural woodland pointed out. (Abstract in Jour. Ecol. 6: 234. 1918.)—*Geo. D. Fuller.*

1978. Schröter, C. **Über die flora des Nationalparkgebietes im Unterengadin.** [On the flora of the National Park district in the Lower Engadine.] Jahrb. Schweiz. Alpenclub. 52: 170–211. *29 fig. 5 pl.* 1918.—A brief discussion of the establishment, extent and purpose of the Swiss National Park is followed by a general survey of its ecological features and a description of the dominant plant associations of the region. The author emphasizes the possible use of the preserve as a laboratory in which numerous, significant ecological experiments can be conducted since the range of conditions represented is so varied and extensive. —*P. D. Strausbaugh.*

1979. Small, James. **The origin and development of the Compositae. Chapter 10. Geographical distribution.** New Phytol. 18: 1–35. *Pl. 1–6.* 1919.—A historical summary of the geographical distribution of Angiosperms is followed by a discussion of *Senecio*. This is considered to have arisen in the Bolivian region of South America, and to have migrated, mostly along mountain ranges, to North America, thence by Behring Strait to Asia and Europe, and thence to Africa. Two pages are here devoted to the ecology of the genus.—Then follows a discussion of the distribution (6 p.) and ecology (2 p.) of the tribes of the Compositae. The author supports Willis' Age and Area hypothesis from the facts of the distribution of the various tribes.—The bibliography includes 135 titles. The plates consist of graphic maps illustrating the genera and tribes.—*I. F. Lewis.*

1980. Soper, E. K., H. F. Bergman, and others. **The peat deposits of Minnesota.** Minnesota Geol. Surv. Bull. 16. *261 p. 17 pl., 10 fig. 4 maps.* May, 1919.—Peat is abundant in the northeastern half of Minnesota, as in many other glaciated regions with coniferous forests. About one-fifth of the area of the state was originally swamp, and about half of this, or 5,217,000 acres has at least 5 feet of peat. The total quantity of workable peat is estimated at nearly 7,000,000,000 tons. Several counties on the southwestern or prairie portion of the state are reported to have no peat at all.—The ecological feature of Minnesota peat bogs are very similar to those described by other writers in the same state and farther east in the same latitude. A special chapter on the vegetation of Minnesota swamps is contributed by H. F. Bergman. The remainder of the bulletin is mainly economic.—*Roland M. Harper.*

1981. Stevens, G. W., and C. W. Shannon. **Plant life in Oklahoma.** Oklahoma Geol. Surv. Bull. 27: 215–246. 1918.—Includes a sketch of the plant geography of the state, and an annotated list of trees and shrubs, the latter taken with some modifications from Circular 4 of the Survey, by C. W. Shannon (1913).—*Roland M. Harper.*

1982. Visher, S. S. **The geography of South Dakota. A detailed discussion of the surface, resources, climate, plants, animals, and human geography, including the history of the area.** South Dakota Geol. Nat. Hist. Surv. Bull. 8. *177 p. 52 fig.* 1919.—In Chapter 6 (p. 68–108), entitled "The bio-geography," plants and animals are discussed together and classified by regions and habitats. A few illustrations of vegetation are included.—*Roland M. Harper.*

1983. Watson, W. **Plants in flower at the end of December, 1918.** Jour. Botany 57: 100–101. Apr., 1919.

1984. Willis, John C. **The age and area hypothesis.** Science 47: 626–628. June, 1918. —In replying to criticisms of Sinnott and Berry, the author points out that, since the hypothesis can be used successfully as a basis for predictions concerning the distribution and composition of a given flora, "it deserves at least a very careful investigation before being rejected." —*P. D. Strausbaugh.*

1985. WILLIS, J. C. **The sources and distribution of the New Zealand flora, with a reply to criticism.** Ann. Botany 32: 339–367. *7 fig. 1 map.* July, 1918.—In this article the author employs facts concerning the flora of New Zealand and adjacent islands in defense of his age and area hypothesis. It is emphasized that the hypothesis is meant to apply only in cases of about twenty allied species and not in individual cases. The age and area explanation of species distribution is to be regarded as a general law whose action may be more or less obscured by the presence of active factors other than age. Twenty-eight questions are proposed which must be answered satisfactorily by the supporters of the dying-out hypothesis in order to fully substantiate their claims. The age and area hypothesis accounts for the presence and distribution of endemics more convincingly than the assumption that they are representatives of a relict flora. In its present stage of development the theory is entirely incapable of accounting for the relative age of herbs, shrubs and trees.—*P. D. Strausbaugh.*

1986. WILLIS, J. C. **The flora of Stewart Island (New Zealand): a study in taxonomic distribution.** Ann. Botany 33: 23–46. *2 fig.* 1919.—The author tests his well-known age-and-area hypothesis in a study of the flora of Stewart Island, south of the South Island of New Zealand. Knowing the flora of New Zealand and of three sets of widely separated outlying islands, and assuming in accordance with the conclusion reached in a previous article that New Zealand has been populated by two great invasions, one northern and one southern, the author predicts what the flora of Stewart Island should be if the age-and-area hypothesis is correct. He also makes many predictions of details in connection with the proportionate representation of groups of various ranks, affinities of endemics, width of distribution etc. All his predictions proving correct with a wide margin, the author maintains that the age-and-area law on which they were based is by far the principal factor in determining geograph ical distribution.—*W. P. Thompson.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

1987. AFZAL, MUHAMMED, AND OTHERS. **Progress report of forest administration in Baluchistan for 1917–18.** *20 p.* Calcutta, 1919.—A routine report on forest operations in the province.—*E. R. Hodson.*

1988. AMILON, J. A. **Höjdtillväxtens förlopp hos träd med olika ljusbehov. [The march of height growth in trees of different light requirements.]** Skogsvårdsfören. Tidskr. 17: 95–108. 1919.—Statistics in regard to relative light requirements and rate of height growth for different tree species in Sweden show that the culmination of height growth occurs earlier in the "light-demanding" than in the "shade-enduring" species. The most "light-demanding" species such as larch, birch and pine, attain their maximum rate of height growth at 10–15 years, while in the most "shade-enduring" species, such as spruce and beech, the maximum is reached at 30–40 years. This relation does not always hold in comparing trees growing on different sites and under different climatic conditions. Such discrepancies, however, are apparent rather than real, due to the fact that under favorable growing conditions the age of a tree as expressed in calendar years is not a true index of its progress in the life cycle of the species. Height growth culminates later, as measured in years, in a tree growing under unfavorable conditions than in a tree of the same species growing under favorable conditions. It is also commonly accepted that trees growing under unfavorable conditions have higher light requirements than trees of the same species growing under favorable conditions of soil and climate. The author concludes that if proper standards of comparison are utilized the relative light requirements and the culmination of height growth remain the same for a given species under varying conditions of site and climate.—*G. A. Pearson.*

1989. ANONYMOUS. **American substitutes for boxwood.** Sci. Amer. 120: 223, 236. *3 fig.* 1919.—Florida boxwood and wahoo are the only native woods having properties approaching boxwood (Turkish, Persian, Corsican or English). Witch hazel, great rhododendron, moun-

tain laurel, thornapple, orangewood, torchwood, mastic and yellow buckeye have some of the characteristics of boxwood and might be used for less exacting purposes.—*Chas. H. Otis.*

1990. Anonymous. **Brimstone tree of Sierra Leone.** Kew Bull. Misc. Inf. [London] 1919: 103–104. 1919.—This is a further account of the brimstone tree, a name applied to species of *Morinda*, family Rubiaceae and to *Mitragyne stipulosa* Kuntze [*Mitragyne macrophylla* Hiern.]—*E. M. Wilcox.*

1991. Anonymous. **Le service forestier de l'Armée d'Orient.** [The forest service of the Army of the Orient.] Rev. Eaux et Forêts 57: 196–199. 1919.—In January, 1918, a forest service was formally established in the French Army of the Orient. This service was charged with the duty both of supplying the French army with wood and of apportioning the forests and wooded regions in the zone of the rear among the various allied armies. In spite of the many difficulties encountered, it succeeded in meeting all of the needs of the army for wood, saved tonnage, stabilized prices, and preserved many forests from destruction.—*S. T. Dana.*

1992. Anonymous. **Tabanuco gum or Porto Rican elemi.** Sci. Amer. Suppl. 87: 201. 1919.—The plant yielding the Porto Rican elemi is known botanically as *Dacryodes hexandra*. The tree is abundant on the island of Porto Rico and attains large size. The bark contains great quantities of gum, locally known as tabanuco. It is used for incense and in torch making. It is thought that a good use can be made of it in the manufacture of varnishes, soaps, felting and printers' ink.—*Chas. H. Otis.*

1993. Anonymous. **The grass tree resins of Australia.** Sci. Amer. Suppl. 87: 137. 1919.—Fourteen species of *Xanthorrhoea* or "grass tree" occur in Australia. The resins collected from these trees may be made to yield picric acid, in amounts varying from 50 per cent in the case of *X. hastilis* to 5 per cent in resin from *X. arborea*. The resins are used in the preparation of spirit lacquers, varnishes, sealing wax, and for similar purposes.—*Chas. H. Otis.*

1994. Anonymous. **Textile fibers in Germany.** Sci. Amer. Suppl. 87: 217. 1919.

1995. Anonymous. **The tonka beans of commerce.** Sci. Amer. Suppl. 87: 78. 1919.—See Bot. Abstr. 3, Entry 2801.

1996. Aubert, L.-G. **L'oïdium et les chênes de l'Ouest de la France.** [Oïdium and the oaks of western France.] Rev. Eaux et Forêts 57: 189–195. 1919.—The fears which were expressed by M. Doé in Rev. Eaux et Forêts, March, 1919, as a result of his experiences in Champagne, that the oïdium disease may prove fatal to the oak in France, are not substantiated by the history of the fungus in the western part of the country. Here, in spite of the fact that the disease has been present and at times virulent since 1907, no serious damage has been done and no particular difficulty has been experienced in converting coppice stands into high forest. The explanation of the markedly different reaction of the oak to the fungus in the two regions appears to be that in Normandy and Brittany the oak is in the zone of optimum growth, while in the more continental climate of Champagne its physiological resistance is less. Even in western France, however, individual trees suffer seriously from the disease when their vitality has been weakened by frequent pollarding or other mistreatment.—*S. T. Dana.*

1997. Bates, C. G. **A new evaporimeter for use in forest studies.** Monthly Weather Rev. 47: 283–294. *6 fig.* 1919.

1998. Bell, T. R. D., and others. **Administration report of the forest circles in the Bombay Presidency (including Sind), 1917–18.** *178 p.* Bombay, 1919.—At the close of the year the area of reserved forests was 13,942 square miles, and 7728 square miles were under approved working plans. Tarwad (*Cassia auriculata*) was, under pressure to develop tanning materials for leather required for war purposes, taken up for its bark and efforts make to increase its natural supply. Many tons of seed were collected in the Northern Circle and sown, and

excellent growth resulted in the Presidency where the young plants came up like grass; but unfortunately the ensuing season was extremely unfavorable for want of rain and most of them perished. Thousands of acres were sown by plowing furrows and dibbling and it is more than probable that with a good year, it will be possible to extend the range of the species. In the Central and Southern Circles, divi-divi (*Acacia coriaria*) was also planted for tanning, but it is a tree and will take at least 15 to 20 years to produce fruit, which is the utilizable portion. This tree thrives best away from the sea coast at an elevation of 2000 feet, as for example, in Dharwar and Belgaum; doubtless also in Poona and Nasik where the rainfall is over 25 inches. Experiments in introducing various species of Eucalyptus, Grevillea and Casuarina, at Toranmal, were continued and all are promising well. If a Eucalyptus could be found which would be successful on the Mahableshwar and Panchgani plateaus it would help to solve the very difficult question of the fuel supply at those places. Specimens of *Anogeissus latifolia* and *Terminalia arjuna*, held locally at North Khandesh to be quite distinct from the ordinary varieties, were sent to the Forest Botanist for investigation. *Terminalia tomentosa* railroad ties supplied from Kanara W. D. to the N. W. railway in 1911 were reported on favorably again.—*E. R. Hodson.*

1999. BERRY, J. B. **Measuring woodland products.** Georgia State Coll. Agric. Bull. 142. *16 p., 7 fig.* 1918.—A discussion of the board foot unit as applied to the sawn product, round logs and standing trees. A simple method of estimating woodland timber is described. - *James B. Berry.*

2000. BLUNT, A. W., AND OTHERS. **Progress report of forest administration in the province of Assam for the year 1917–1918.** *29, 49 p., 1 map.* Shillong, India, 1918. A routine annual report for the province. The area of reserved forests in Assam was increased by 470 square miles during the year and an additional area of 329 square miles was in process of reservation at the close of the year. A new departure was a beginning in the formation of village forests, under the management of local committees for the supply of fuel and other petty forest produce to the villagers. Six forest villages were established in the Western Circle, the villagers giving free labor for the usual number of days, and no trouble was experienced in handling them. During the year the gross revenue increased, due to larger returns from grazing and to the demand for railway sleepers and tea-box timber. Experiments were continued in burning the undergrowth in sal (*Shorea robusta*) forests to favor regeneration and were successful, to a certain degree, in the higher and drier localities where the undergrowth burned freely.—*E. R. Hodson.*

2001. BOULGER, G. S. [Rev. of: STEARNS, E. P. **Commercial forestry in Britain, its decline and revival.** *186 p.* John Murray: London, 1919.] Jour. Botany 57: 260–262. 1919.

2002. CAMPBELL, R. H. **Report of the Director of Forestry for the year 1918.** (Pt. 3, Ann. Rept. Canadian Dept. Int., 1918.) *70 p., 13 fig.* Ottawa, 1919.—Progress is indicated in the extension of fire laws in the prairie provinces, the establishment of a forest experiment station at Petawawa, Ontario, the collection of Pacific Coast tree seeds for tree planting in the British Isles, and the testing at the request of the New South Wales government of Australian woods believed to be valuable for pulping. At the Dominion Forest Products Laboratory in Montreal the project of compiling all the literature from all languages on waste sulphite liquors has been completed, and in other projects such as the resolution of alcohol from pulp waste liquors, the investigation of the chemistry of pulpwoods, and tie impregnation experiments on jack pine and hemlock a considerable degree of success has been attained.—*H. C. Belyea.*

2003. CAVENDISH, F. H. **Report on forest administration in the Andamans for the year 1917–18.** *39 p.* Calcutta, 1919.—A routine report covering forest operations in the Andaman Islands.—*E. R. Hodson.*

2004. Chevalier, A. **Premier inventaire des bois et autres produits forestiers du Tonkin. [First inventory of the timbers and other forest products of Tonkin.]** Bull. Econ. Indochine 22: 495–540. 1919.

2005. Clutterbuck, P. H. **Annual progress report of forest administration in the United Provinces, 1917–18.** *60 p.* Allahabad, India, 1918.—The routine annual report with statements in tabular form appended. The area of reserved forests increased from 5582 square miles to 5957 square miles during the year, while the entire area now under control is 7495 square miles. Exclusive of leased forests the area of the forests under the control of the Forest Department is 6.7 per cent of the total area of the provinces. At the close of the year 4038 square miles were under approved working plans. Some form of regulated felling is practised on 66 per cent of the area under working plans. The chir (*Pinus longifolia*) tar work has passed the experimental stage and the product may be placed with the resin industry as an established minor forest product. A separate report has been published on the resin industry for the financial year which presents a very detailed description of the present position of the industry in Kumaun and brings the history of the progress made in recent years up to date. Experimental plots are maintained in West and East Almora to ascertain the effects of grazing and burning on chir seedlings, as well as the influence of heredity and environment, in causing twisted fiber (spiral grain). Results are not yet shown, as sufficient time has not elapsed. 28,280 maunds (maund = 80 pounds) of various tan stuffs were collected and sent to the government tannery at Allahabad.—*E. R. Hodson.*

2006. Compton, W. **Forest economics: some thoughts on an old subject.** Amer. Forestry 25: 1337–1339. 1919.—A contribution to the general topic "A national forest policy." The future permanent supply of standing timber as a raw material for industry is a problem of economics. How much timber, what kinds of timber, where it should be located, what lands should be timbered and how the timber should be used can not be determined by applying principles of forestry. When the nation's timber needs have been determined—then the principles of forestry correctly applied may show how these needs can best be met. Fourteen points to be considered in connection with a national plan for efficient forest utilization and adequate replacement of timber are discussed in some detail.—*Chas. H. Otis.*

2007. Cornthwaite, H. G. **Panama rainfall.** Monthly Weather Rev. 47: 298–302. *4 fig.* 1919.

2008. Crevost, C., and C. Lemarié. **Plantes et produits filamenteux et textiles de l'Indochine. [Fiber and textile producing plants of Indo China.]** Bull. Econ. Indochine 22: 365–401. *3 pl., 1 fig.* 553–591. *2 pl., 9 fig.* 1919.—See Bot. Absts. 4, Entry 53.

2009. Dana, Samuel T. **Public control of private forests in Norway.** Jour. Forestry 17: 497–502. 1919.—The laws under which Norway handles its private forests, which constitute 75 per cent of the forest area, are summarized. Local communities can adopt regulations for handling protection forests, the boundaries being fixed by a state forester and private owners. Regulations handling protection forests are provided for by the council and must have the approval of the national forest service. Burning is probibited, all dry, dead material must be removed before any green tree is cut, and community councils establish other rules. Forests not coming under the control of the community are managed by the government and cutting under 20 cm. is forbidden in coniferous forests.—*E. N. Munns.*

2010. Danielson, Uno. **De Ölandska skogsmarkernas produktionsförmåga. [Productive capacity of the forest lands of Öland.]** Skogsvårds Fören. Tidskr. [Stockholm] 17: 12–18. *5 fig.* 1919.

2011. De Brun, H. **Les taillis du midi et la guerre. [Coppice in southern France and the war.]** Rev. Eaux et Forêts 57: 147–150. 1919.—The lack of labor and means of transportation resulting from the war have delayed the regular cuttings in the evergreen oak cop-

pice stands of southern France by 2, 3, and even 4 years. This delay may be a blessing in disguise since it affords an opportunity to lengthen the rotation with the object of producing larger sized material, which in the last 15 or 20 years has become increasingly valuable. Assuming that the Vesulian law (that the volume production varies as the square of the age) holds for trees between 20 and 30 years old, calculations indicate that the net revenue will be three or four times as great at 25 as at 20 years of age. The longer rotation is also preferable from a silvicultural point of view since the short rotations commonly in use have impoverished both soil and stands.—*S. T. Dana.*

2012. DE LA HAMELINAYE, H. **De l'utilité et de la tenue des calepins de bailvage. [Usefulness and preservation of staddle notebooks.]** Rev. Eaux et Forêts 57: 200–201. 1919.—Staddle notebooks should always be preserved since they often contain much information of the greatest value, particularly when they cover two or three rotations. The only difficulty in using them lies in the fact that the classifications used, which should always be clearly noted in the notebooks themselves, have varied from time to time. This is particularly serious when the staddle has not been regarded as limited to seedlings of the same age as the coppice, but as including all seedlings of a given size irrespective of their age. This practice, which is now becoming common, is open to serious objection, since it frequently leads to inability on the part of forest officers to determine to which rotation a given tree belongs. The result is that when it is necessary to choose between retaining a young standard of the same rotation as the coppice and another of the previous rotation, the latter is usually chosen in spite of the fact that its future growth will be decidedly less.—*S. T. Dana.*

2013. DE JONG, A. W. K. **Tapproeven hij Hevea brasiliensis. [Tapping experiments on Hevea brasiliensis.]** Arch. Ruhhercult. Nederlandsch. Indië 3: 1-6. 1919.—Results of 5½ years of tapping experiments: One left cut 1.60 m. high on a third tapped twice daily gives less latex than other systems of tapping. One left cut 1.10 m. high on a quarter tapped twice daily and three left cuts at a distance of 50 cm. on a quarter tapped twice daily give less than the following three methods: Two left cuts on a quarter at a distance of 50 cm. tapped daily, two left cuts on a third at a distance of 75 cm. tapped daily, and two left cuts on a third beginning at 85 cm. height, one going upward and the other as usual, tapped daily. The last three methods give practically the same yield. One left cut on each of two opposite quarters at 1.10 m. height tapped daily gives 30 per cent more rubber than the three last mentioned. Results of 18 months experiments show tapping from left to right has an advantage in yield of 14 per cent over similar tapping from right to left.—*W. E. Cake.*

2014. DE VRIES, O. **Invloed van enkele chemicalien op de innerlijks eigenschappen van den ruhber. [Influence of certain chemicals on the inner qualities of ruhber.]** Arch. Ruhbercult. Nederlandsch. Indië. 2: 67–104. 1918.—A review of experiments with some of the chemicals most commonly used in the preparation of ruhber from Hevea latex, viz: anti-coagulants, sodium sulphite, formaldehyde, and sodium carbonate; anti-oxydants, sodium bisulphite and thiosulphate; the closely related substances, sodium acetate and sulphurous acid. Sodium sulphite is placed in the front rank as an anti-coagulant by the fact that it causes a small but decided improvement of the ruhber in tensile strength, a diminution of the standard time of cure and of the slope of the stress-strain curve, and an increase in viscosity index. Formaldehyde has just the opposite effect. Sodium carbonate has little effect. The effects of sodium bisulphite on the ruhber are good. Thiosulphate in general has negligible effects. In making the usual types of plantation rubber, crepe and smoked sheet, acetic acid is used as a coagulant. In the case of three of the substances examined, sodium sulphite, bisulphite, and thiosulphate, interaction with acetic acid yields two common reaction products, sodium acetate and sulphurous acid. Sodium acetate increases rate of cure and viscosity; improvement in tensile strength and viscosity, if actual, are very small. Sulphurous acid, as a coagulant, has a favorable influence on the inner qualities of the rubber, as compared with acetic acid, and shows a small increase in tensile strength and viscosity, a marked decrease in slope of the stress-strain curve, whilst the rate of cure remains

the same. From these data it is clear that the increase in rate of cure caused by sulphite and bisulphite is due to the subsequent formation of sodium acetate. On the contrary, the decrease in the slope of the stress-strain curve (improvement) must be caused by the sulphurous acid. Since both sodium acetate and sulphurous acid increase the tensile strength and viscosity, sulphite and bisulphite must of course do likewise.—*H. H. Bartlett.*

2015. De Vries, O. **Invloed van verandering van tapvlak op latex en rubber.** [Influence of the change of tapping surface on the latex and rubber.] Arch. Rubbercult. Nederlandsch-Indië 3: 130–138. 1919.—In *Hevea*, the change of tapping system or the change of tapping surface when accompanied by change of tapping system has great influence on composition of latex and properties of rubber. Opening a tapping cut on trees that have been resting for some time, or opening a tapping cut on untapped trees gives a latex of high rubber content and a rubber of very small rate of cure. However by merely changing to a new tapping surface in bark that has had a period of rest while the whole tree with its coherent system of latex vessels has not been at rest, no latex of especially high rubber content is obtained, although latex from such a surface often shows phenomena ordinarily accompanying opening of a new cut; *viz.*, teadency to oxidation (violet color), or yellow color of latex.—*W. E. Cake.*

2016. De Vries, O. **Latex en rubber van onder- en bovensnede.** [Latex and rubber from upper and lower cut.] Arch. Rubbercult. Nederlandsch. Indië. 3: 124–129. 1919.—A comparison of the properties of the latex and rubber from the upper and the lower cut when tapping with two left cuts on one quarter. Data show that latex from each of two cuts is nearly identical in all important characteristics. The greatest variation lies in the time of cure where the product from the upper cut has a slightly shorter period.—*W. E. Cake.*

2017. Dixon, H. H. **Mahogany and the recognition of some of the different kinds by their microscopic characters.** Notes Bot. School Trinity Coll. Dublin 3: 3–58. *25 pl.* 1919.—The structure of the wood of 45 species is described and each is illustrated by photomicrographs. A key to these species based on microscopical characters is also given.—*G. H. Rigg.*

2018. Etter. **Zusammenhänge zwischen Bestandeslagerung und Schneedruck.** [The relation between locality of stand and snow damage.] Schweiz. Zeitschr. Forstwesen 70: 166–167. 1919.—During the months of March and April, 1919, there was heavy snow damage noted in a stand of Scots pines 30 to 60 years old. This stand was on a slope to the south and west of an older stand of timber. The snow in this locality usually comes from the south and west and causes an exceptionally deep snow in the lee of this larger forest. A young stand can not resist this heavy snow on account of its smaller stem and weaker root system. This combination of conditions results in the heaviest snow damage that has been noted. This condition extended over a region of about 30 acres.—*J. V. Hofmann.*

2019. Fernow, B. E. [Rev. of: Zon, Raphael. **Reconstruction and natural resources.** Jour. Political Econ. 27: 280–299. 1919.] Jour. Forestry 17: 598–600. 1919.—The regulation of the national forests so as to provide homes for 300,000 families should be begun at the present time, developing permanent yields wherever possible. Intensive development in community settlement is needed at this time and is offered by real forestry.—*E. N. Munns.*

2020. Flury, P. H. **Bodenverbesserungen oder Waldrodungen?** [Soil improvement or forest management?] Schweiz. Zeitschr. Forstwesen 70: 117-124. 1919.—The article discusses the possibilities of improving forest land through forest management and by artificial means such as drainage and irrigation. The author states that 25 per cent of the forest land of Switzerland is unproductive with possibilities of improvement. He advocates that the soil can be greatly improved by proper management of different species; that swamps can be made productive through drainage, and arid lands can be irrigated. In round numbers there are possibly 140,000 hectares which are possible forest land. Work upon this basis

from 1885 to 1912 brought 34,117 hectares into forest production at a cost of 15.64 million francs. This was divided in approximately the following proportions: four-fifths for drainage, one-twelfth for irrigation, and the remainder for improvement cuttings. [See next following Entry, 2021.]—*J. V. Hofmann.*

2021. FLURY, P. H. **Bodenverbesserungen oder Waldrodungen?** [Soil improvement or forest management?] Schweiz. Zeitschr. Forstwesen 70: 139–155. 1919.—The federal forest laws of Switzerland, passed in 1902, provided that the forest area must not be reduced. This provision was made because it was found that the forest area was too small to supply the demand and provide for continuous forest industries. The method of clear-cutting has always been discouraged because it resulted in nonproductive land being left without a forest crop. The unprecedented demand for agricultural land during the world war caused further laws to be passed providing for the replacement of forests and their protection. The increased cost of labor is a decisive factor at the present time and is a strong argument for bringing the forests to their highest state of production. The author gives figures which show that 13 days' labor per hectare per year are required to produce a mixed stand 25 years old, also that a cost of 20 days' labor is required to prepare the soil and stock a stand. He gives other specific instances which are below and above these figures. The contention is that the forest should be extended to the level as well as the hilly country to be used as a protection forest against severe climatic conditions and to moderate the climate to favor the agricultural crops. [See next preceding Entry, 2020.]—*J. V. Hofmann.*

2022. FORBES, R. D. **A forest policy for Louisiana.** Jour. Forestry 17: 503–514. 1919.—Louisiana embraces 28 million acres, 25 per cent of which are in use now, 84 per cent of which are arable, and 16 per cent of which are best suited for forests. Conditions in each of the natural vegetative regions are summarized. The forestry department is to work for the acquisition and management of true forest lands, fire protection of the pine forests, and the encouragement of forestry in woodlots in the agricultural region and in timbered areas on large tracts of privately owned lands.—*E. N. Munns.*

2023. GRAVES, HENRY S. **Farm woodlands and the war.** U. S. Dept. Agric. Yearbook 1918: 317–327. 1919.—The demands of war for boxes, crates, and containers and the special demand of hardwoods for specialized purposes, brought out clearly the importance of the farm woodlot. Walnut, ash, hickory, and other invaluable hardwoods do not grow in great massed forests but are mixed and scattered over wide areas and are in the hands of small owners. Black walnut for gunstocks and aeroplane propellers, black locust for tree nails, chestnut for tanning, ash and hickory for tools and vehicles, oak for ships and wood for acetone and alcohol; all had to come from the woodlots scattered through the country. This market developed by the war is bound to keep up as the industries using such lumber are peace industries with a great future. Woodlots should be improved and waste land should be set out in these valuable trees. Farm forestry should become an appealing practical business proposition.—*C. J. Shirk.*

2024. HARPER, ROLAND M. **A forest reconnaissance of the Delaware peninsula.** Jour. Forestry 17: 546–555. 1919.—The Delaware peninsula, embracing Delaware and part of Virginia and Maryland is divided into five regions based on geological structure and soil differences which are described according to the tree growth, and for each region a tree census was compiled.—*E. N. Munns*

2025. HARTJENS, J. C. **Onderzoek naar de practische bruikbaarheid van een nieuw apparaat ter bepaling van het rubber-gehalte van latex.** [On the use of a new apparatus for the determination of the rubber content of latex.] Arch. Rubbercult. Nederlandsch-Indië 3: 77–104. 1919.—A long article on the description, use, and the results obtained with a new and complicated colorimetric apparatus to determine the rubber content of *Hevea* latex. Results show that at present the apparatus is of little value in determining the rubber content of latex, and the use of the apparatus in factories on rubber estates is pronounced impractical because it demands too careful handling and the utmost cleanliness.—*W. E. Cake.*

2026. Herrman. **Die Keimungsenergie des Kiefernsamens in Theorie und Praxis. [Germination-energy of pine seeds in theory and practice.]** Naturw. Zeitschr. Forst- u. Landw. 17: 53–57. *Pl. 1–2.* 1919.—Haack's well-known views on germination tests, and especially his "germination-energy" measure of the value of seeds for planting purposes are reviewed. It is pointed out that in practice the number of seedlings secured may not, necessarily, be proportionate either to the "germination-caergy" or the final germinatioa as established under controlled conditions, and that many coaditioas external to the seed may affect the aursery or field result more potently than the quality of the seed, or the depth of covering, the factors which are evidently most important in tests. In peculiar circumstances the germination which, in a test, would occur within the first 10 or 15 days, may aot survive, but may be replaced by that which would either in the germiaator or elsewhere occur later and under more favorable circumstaaces. Two iastances are cited ia which very good nursery stands were secured after the seed had lain in the grouad the whole of aa uafavorable season. The writer, however does not attempt to say that this "hold-over" germination, which is not uncoinmon with the pines, represents entirely the seed which uader test coaditioas would have been the last to germinate.—*C. G. Bates.*

2027. Hesselman, Henrik. **Naturforskningea och de skogshiologiska prohlemsn. [Natural research and the forest biological prohlems.]** Skogsvårdsfören. Tidskr. 17: 3–11. 1919.

2028. Hesselman, Henrik. **Studier över de aorrländska tallhedarnas föryngringsvillkor. II. [Studies of natural reproduction in the piae heaths of Norrland.]** Skogsvårdsfören. Tidskr. 17: 29.76. *16 fig.* 1919.—In portions of Norrland, Sweden, the pine forests (*Pinus sylvestris*) reproduce themselves with such difficulty as to cause serious coacern amoag foresters. The ground is usually covered with a dense mat of lichens, mainly *Cladina alpestris*, which grow to a height of more than a decimeter. The lichen mat apparently does not seriously interfere with germination because young seedlings are abuadant. They do not, however, develop normally and soon die. Earlier investigations which Hesselman has carried on for more than 10 years have shown that death is not due to drought, lack of light, grazing, snow pressure, or competition with brush and lichens. Numerous chemical analyses have shown that wherever the pine seedlings develop normally the soil contains a noticeably higher per cent of available nitrates than where they are of poor development. The conclusion, therefore, is that available nitrogen in the soil is the critical factor. The presence of decaying wood or leaves when mixed with the mineral soil seems to promote nitrification. Seedlings grow much better near older trees, stumps and decaying logs than in the open. Experiments of 10 years standing have shown a marked improvement as a result of mixing sod with the soil, or even merely stirring up the soil with a hoe. Similar results are often obserfed after logging operations in which the surface layer of organic matter is mixed with the soil, thus promoting nitrification.—*G. A. Pearson.*

2029. Hill, M. **Report of the forest administration of the Ceatral Provinces, 1917–18.** *96 p.* Nagpur, British India, 1919.—The comprehensive detailed annual report with tabular statements covering the forest operations in the Provinces duriag the year. Out of the totnl area of state forest of 19,649 square miles 85 per cent with aa area of 16,544 square miles has approved working plans. No working plans are considered necessary at the present time for an area of 2503 square miles. Included in the research projects is the scieatific cultivation of tarwad (*Cassia auriculata*), for tanning purposes, which grows wild in certain parts of the Provinces. A tannin research laboratory is in operation at Maihar. Due to the war's demand the scientific production of lac has also been undertaken and plans made for propagating it on a more extensive scale. An officer will he placed especially in charge of the operations which will iaclude a demonstration of improved methods to the lac growers. An example is given of replacement of inferior species of trees in the forests hy more valuable trees, hy poiating to the promising results ohtaiaed hy sowing sandal in the Akola Division. The need is indicated of iavestigating the utilization of myrabolan (*Terminalia chebula*) which is of great importance in the tanning industry. Ia the Southern Circle the

sowing of sal under the protection of telia (*Wendlandia exserta*) was continued. *Cinnamomum camphora* sowings were made in frost holes in the Bilaspur Division with the object of protecting the young sal. Sixty-eight thousand, six hundred and seventy-nine acres were exploited under the coppice with standards system against 62,037 acres the preceding year. Mechanical tests showed that Allapilli teak differed but little from Burma teak, the latter having a slight advantage in transverse strength and the former in shearing and compression strains. Chanda teak is said to be valuable for ornamental purposes and in furniture and panel work as it takes a smooth finish.—*E. R. Hodson.*

2030. HOLMES, J. S. **The forests of North Carolina.** Bull. North Carolina Dept. Agric. 40: 12–13. 1919.—Brief statement of forest resources and policies in North Carolina with outline of plan to promote conservation.—*F. A. Wolf.*

2031. HORTON, ROBERT E. **Measuremsat of rainfall aad snow.** Monthly Weather Rev. 47: 294–296. 1919.—The object of this paper is to describe methods of measuring rainfall and saow and to discuss the errors and inaccuracies of such measurements, with the view of suggestiag methods of securing rainfall records with the highest possible degree of accuracy and usefulness. Some attention is given to the question of reliability of results obtained from a single raiagage as applied to the larger or smaller area around it.—*Robert E. Horton.*

2032. JOSHI, SHAMBHOO DATT, AND OTHERS. **Annual report on the forest administration in Ajmer-Merwara for the year 1917–1918.** *28 p.* Ajmer, India, 1919.—A routine report on forest operations in the province with financial statement. Covers changes in forest areas, management, protection, silviculture, planting, research, and experiments, in brief summaries.—*E. R. Hodson.*

2033. KLASON, PETER. **Kolning och torrdestillation av ved och därvid framställbara produkter. [Charcoal burning and dry distillation of wood, and the resultant products.]** Skogsvårdsfören. Tidskr. 17: 125–190. *37 fig.* 1919.

2034. LATHAM, H. A., AND OTHERS. **Administration report of the forest department of the Madras Presidency, 1917–18.** *147 p.* Madras, British India, 1919.—Annual report for the province covering forest operations, with detailed tabular statement. The area of reserved forests increased to 18,838 square miles and the total area of reserved forests and reserved lands at the close of the year was 19,506 square miles. Approved working plans cover an area of 8259 square miles. The areas under the various sylvicultural systems were as follows: clear felling, 130 square miles; selection felling, 1016 square miles; simple coppice, 690 square miles; coppice with standards, 1807 square miles and improvement felling, 1224 square miles. Large quantities of the bark of *Anogeissus latifolia* were supplied to the Munitions Board for tanning purposes. This is a new discovery made in the Madras Leather Trade School. The leaves of this tree are also a valuable tanning material. Experiments in the inoculation of *Butea frondosa* and *Zizyphus xylopyra* with lac culture are being made by the Government Entomologist in the Central Coimbatore Division.—The outstanding feature of the work of the Forest Department, during the year, was the varied activities designed to meet the demands of the Military Department. Large supplies of hay and tanning stuffs were procured for the Munitions Board and the department did a great deal to increase the supply of timber required for war purposes.—*E. R. Hodson.*

2035. LIE, HAAKON. **Fjeldskogen. [Mountain forests.]** Tidsskr. Skogbruk 27: 145–190. 1919.—The author seeks to awaken the public and foresters to greater appreciation and care of the more elevated forested lands in Norway. The introduction deals with general requirements of the trees and plants, relative importance of the climatic factors, the abundance and distribution of trees in different parts of the country, the characters, peculiarities and functions of the mountain forests in particular. A discussion follows bearing on the present lower altitudinal limit of the forest than in earlier times. This is explained on the ground of a warmer climate evidenced by shellfish which now live farther south in Europe

and the fact that the country lay 50 meters lower after the recession of the glaciers. The value of different native species of trees for use in the higher forests is considered; of these Norway spruce appears best adapted since it reproduces better in the upper regions than other trees, protects the ground better, and withstands climatic conditions better. Recommendations for cutting and enactment of laws for better care of these forests are given.—*J. A. Larsen.*

2036. Ljungqvarl, Gustaf S. **Om kompassens missvisning.** [Concerning misdirection of the compass.] Skogsvårdsfören. Tidskr. 17: 191–198. *5 fig.* 1919.

2037. Lundberg, Gustaf. **Om prissättningsenheter vid arbeten och handel med stubbved.** [Price standards in work and trade in stump wood.] Skogsvårdsfören. Tidskr. 17: 77–94. *9 fig.* 1919.

2038. Macdonald, A. F. **Mexico as a source of timber.** Amer. Forestry 25: 1361–1362. *1 map.* 1919.—Mexico may conveniently be divided into three districts; first, the great tropical forest belt, covering almost the entire peninsula of Yucatan, as well as the small states of the southeast which border on the Gulf of Campeche; second, the temperate zone forest belt, located in the northwestern section of the Republic, and extending northward almost to the American border; and between these two districts is the treeless belt, some of which is cultivated, but much of which is arid. The tropical forest belt yields logwood and other dye woods, mahogany, ebony and other precious woods and Spanish cedar. Pine is the commercially important timber of the temperate zone forest belt, the principal varieties of which, in the order of importance, are yellow short leaf, yellow long leaf and Weymouth; spruce and fir occur in quantity, together with some oaks, cedars and other hardwoods.—*Chas. H. Otis.*

2039. McIntosh, R. **Progress of forest administration in the Punjab, 1917–18.** *64 p.* Lahore, British India, 1918.—The total area under the management of the Forest Department increased from 7211 square miles to 7074 square miles mainly due to areas released for colonization in the Chenab and Multan Divisions. The Jallo factory produced 16,426 maunds (maund = 80 pounds) of rosin and 46,709 maunds of turpentine. The future prospects of the industry in the Punjab are exceedingly bright. During the past year only 14,521 acres of forest were tapped, but it is estimated that with the early removal of the chief obstacles to progress (i.e., scarcity of labor, lack of staff, and difficulties connected with transport from forest to railroad shipping point) tapping operations could be extended at once to about five times this area in the Punjab and North-West Frontier Province, and that the yield of rosin and turpentine could be increased in similar proportion. This estimate excludes tappable areas in Jammu, Kashmir, Chamba and other native states. The Imperial Forest Botanist investigated the spread of *Fomes lucidus* in the irrigated plantations and made suggestions for combating it. The ravages of *Trametes pini* in the hill forests continue and no remedy is apparent. Self-sown khair (*Acacia catechu*) is reported to be spreading in Kangara; and the regeneration of *Prosopis glandulosa* in the Pahbi continues to be good. In the bamboo forests there is little reproduction by seed, but the production of shoots is generally sufficient. In Kangara the coppice of bam oak (*Quercus incana*) is reported to be excellent. . Experiments show that coppice felling of this oak can be made at any season of the year without causing any discernible difference in the vigor of the shoots, and they further show that since practically all the shoots come from dormant buds and not from the cambium layer, dressing or trimming the stumps is unnecessary. In Lahore the experiments for determining the fertility of shisham seed obtained from coppice shoots, and the efficacy of early thinnings in irrigated plantations are being continued. Of the various exotics tried at *Dharamsala*—Spanish chestnut, *Cryptomeria*, *Robinia*, *Acacia dealbata* and camphor—none are successful. *Robinia* continues to do very well in Simla. It is particularly useful for clothing unstable slopes where excessive weight of trees is undesirable. The various species which were tried in Changa Manga as substitutes for shisham standards were all frozen down and failed completely.—*E. R. Hodson.*

2040. MÅRN, L. MATTSSON. **Några synpunkter på variations- och korrelations-beräkningar. Med anledning av Sven Petrinis undersökning: "Form-punktametoden och dess användning för formklassbestämning och kubering."** [Some views regarding mathematical variations and correlations, with reference to Sven Petrini's investigation: "The form-point method and its use in determinations of form-class and volume."] Skogsvårdsfören. Tidskr. 17: 109–122. *1 fig.* 1919.

2041. MER, E. **Influence de la dimension des arbres sur l'efficacité des éclaircies.** [Influence of size of trees on results of thinning.] Rev. Eaux et Forêts 57: 141–146, 165–175. 1919.—Two sample plots in a stand of fir about 60 years old and averaging respectively 9.3 and 11.2 cm. in diameter, were thinned in 1886 and again in 1899. Careful records of growth which were maintained until 1911 showed that the increased growth resulting from the thinnings was uniformly greater both in diameter and volume in the smaller trees. This difference is probably due to the fact that the smaller trees were younger and therefore more vigorous than the larger trees. While further investigation is needed to determine how generally applicable are the results of this experiment, two conclusions may be drawn from it,—(1) that sample plots to study the effect of different degrees of thinning should be composed of trees of as nearly as possible the same size; (2) that as a rule thinnings may be profitably undertaken at an earlier age than is now customary.—*S. T. Dana.*

2042. MONGENOT. **L'epicea et la sécheresse.** [The spruce in relation to dryness.] Compt. Rend. Acad. Agric. France 5: 713–715. 1919.—Discusses the relation of the spruce to the water supply and shows how it is this factor that limits the altitude below which this tree cannot be planted in the south of France, since the rainfall decreases as one descends.—*E. A. Bessey.*

2043. MYHRWOLD. **Den svenske statsskogforvaltning aar 1917.** [Review of the Swedish government forest report for 1917.] Tidsskr. Skogbruk 27: 202–208. 1919.—The total area within designated forest land in Sweden is given at 22,398,195 hectares. Of this the Government owns 6,070,230 hectares and maintains supervision over 2,640,704 hectares in the hands of different state institutions. 3,757,109 hectares of the Government owned land is considered productive forest area. The Government maintains seven forest schools and one forest school of higher training. The permanent and temporary personnel consist of 1556 men, all of whom have passed the required exams. 505 men make up the permanent force. In 1917 the Government sold from its holdings, 4,189,694 cubic meters (m^3) of miscellaneous forest products at a total receipt of 38,422,635 crowns. During the same year the sum total of the expenditures amounted to 12,273,689 crowns. The net receipt was therefore in the neighborhood of seven million dollars. Only 1,200 hectares burned over in 1917. (One crown is about 28 cents, and one hectare is 2.47 acres.)—*J. A. Larsen.*

2044. NORDSTEDT, C. T. O. [Swedish Rev. of: HASSELMAN, H. **Iakttagelser öfver skogsträdens spridningsförmåga.** (Observations on the power of distribution of forest trees.) Medd. Statens Skogsförsökeanst. 16: 27–66.] 1919.] Bot. Notiser 1919: 167–168. 1919.—See Bot. Abstr. 4, Entry 232.

2045. OPSAHL, WALDEMAR. **Indtryk fra en studiereise gjennem de danske skoge.** [Impressions from a trip through the Danish forests.] Tidsskr. Skogbruk 27: 209–221. *6 pl.* 1919.—Most foresters know of the success reached in afforesting the barren heaths of Jutland, Denmark, but few have realized the years of experimentation, and the unflinching faith and courage of those who fathered this project. Though several companies, which had been promoted for reforesting the dunes, had failed, ENRICO DALGAS became convinced that it could be done and gave himself and his fortune to the work. The company which he organized has successfully reforested 80,000 hectares and the Danish Government 50,000 hectares. The work began about 50 years ago, and at the present time only forty per cent of the total waste area remains unreclaimed. One 55 year old stand of Norway spruce, planted where nothing but worthless brush grew, yielded 3950 cubic feet per hectare. The work is done as

follows: The heath is burned, then plowed and disced and allowed to remain thus three years, plowed again a little deeper and in a manner to break up all roots and again left for 2 years. This process brings about aeration, bacterial life decomposition and formation of humus. In some places lime and phosphoric acid are plowed under in the fall. A species of scrub pine is planted with one of Norway spruce to two of pine. The pine requires very little air and soil moisture, aids in formation of humus and protects the spruce.—*J. A. Larsen.*

2046. Pammel, L. H. **Effect of winter on shrubs at Ames, Iowa.** Rept. Iowa State Hortic. Soc. 53: 39–41. 1918.—See Bot. Absts. 4, Entry 868.

2047. Parnell, Ralph, and others. **Progress report on forest administration in the North-West Frontier Province for tha year 1917–18.** *15 + xxi p.* Peshawar, India. 1918. —A routine report on forest operations in the province. There was a marked increase in the out-turn of timber, and the departmental exploitation of wood fuel and charcoal also increased materially. A total of 12,716 cubic feet or timber and fuel per square mile was produced, or nearly double that of the next provincial competitor (Bihar & Orissa). The financial results indicate that a vigorous commercial forest policy is desirable.—*E. R. Hodson.*

2048. Pethini, Sven. **Om uppskattning av höjdtillväxten å stående träd. [Calculation of height growth of standing trees.]** Skogsvårdsfören. Tidskr. 17: 19–24. 1919.

2049. Record, Samuel J. **Storied or tier-like structure of certain dicotyledonous woods.** Bull. Torrey Bot. Club 46: 253–273. 1919.—See Bot. Absts. 3, Entry 2442.

2050. Rolfe, R. A. **The true mahoganies.** Kew Bull. 1919: 201–207. 1919.—Commercial planting of mahogany trees in the West Indies in recent years has made it necessary to establish taxonomically the various species. The original mahogany is *Swietenia mahagoni*, a tree known in the West Indies for more than three centuries and often called Spanish Mahogany, but in recent years the term mahogany has been extended to include various red-brown timbers belonging to this and other genera of the family Meliaceae and in part to other families. The present paper is an account of the history and botanical features of *Swietenia mahagoni*, *S. humilis* and *S. macrophylla*.—*E. M. Wilcox*

2051. Rutgers, A. A. L. **Selectie en uitdunning. [Selection and thinning.]** Arch. Rubbercult. Nederlandsch-Indië 3: 105–118. 1919.—Article emphasizing the necessity of a systematic selection of rubber trees for size and high latex yield, and also the removal of a large number of practically valueless trees on the plantations of Sumatra and Java and Ceylon. Selection may be made by collection of seeds from superior seed trees or by propagation through budding. Data is given to show that in thinning out from 15 per cent to even 75 per cent of the trees on the plantations the yield is not reduced but either remains constant or is increased.—*W. E. Cake*

2052. Sampson, Arthur W. **Suggestions for instruction in range management.** Jour. Forestry 17: 523–545. 1919.—The forester must have a thorough knowledge of the livestock business and the subjects which would give the student an insight into range management are described as to application, ground to be covered, related topics and usefulness. The subject matter is discussed under seven heads for the grazing course proper, and for related topics. The type of man and the character of the work are portrayed.—*E. N. Munns.*

2053. Sanford, F. H. **Progress in blow sand control.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 130–131. Feb., 1919.—A brief account of some experiments begun in 1916 to control the blowing of sand on the dunes along Lake Michigan, using cuttings of Carolina poplar and basket willows set in belts to form temporary sand catchers, supplemented by barriers of beach grass.—*E. A. Bessey.*

2054. SCHÄDELIN, W. **Wirtschaftliche Zuchtwahl?** [Practical selection.] Schweiz. Zeitschr. Forstwesen 70: 101–103. 1919.—The author discusses the questions whether selection should be based on simply selecting the best of the present stand or whether the stand should be improved by breeding and selection. In order to apply selection intelligently the characters of the parent tree must always be considered. In this connection any seed study must take into account both the staminate and pistillate tree. This, naturally, involves a long term study extending through several generations of the trees to be taken as a basis. In improving a forest by selection it is always desirable to choose trees which have been in a given locality for several generations. By using trees of this class which are desirable the characters are more nearly perpetuated than by the introduction of foreign characters into a different locality. In regions where the natural forests have been perpetuated for several generations and the characters have become fixed to a large extent, clear cutting methods have destroyed the forests completely and have been replaced by artificial methods and plants of foreign characters have been introduced. The author points out that different qualities of different species, such as the twisted grain of the spruce, the crenate structure of the wood, liability to frost and other factors which apply more or less to hard woods and conifers, must all be taken into consideration in developing the forest. Seed studies have not gone into sufficient scientific detail to give definite data on these characteristics. The author takes exception to PROFESSOR ENGLER'S work on seed studies because in these studies only the staminate parent tree was considered. He contends that the weather influence on the seed extends through two seasons, usually the season of flowering and the season of maturity. These factors as well as all environmental factors must be considered. In conclusion he states that selection must either be done to improve the next stand or selection breeding undertaken to improve and fix the improved characters in the future stand.—*J. V. Hofmann.*

2055. SIBBERN, GEORG. **Fra en reise i Frankrike.** [From a trip to France.] Tidsskr. Skogbruk 27: 191–199. *4 pl.* 1919.—The author describes briefly several natural and planted forests in France and the tract in the war-zone to be reforested by the Norwegian Government in greater detail.—*J. A. Larsen.*

2056. SIECKE, E. O. **Texas forest facts.** *16 p.* Office of State Forester: College Station, Texas. 1918.—The pamphlet is devoted to forest statistics for Texas. The present annual returns from the farm woodlands of the state amount to $12,000,000. There is included an interesting table giving the ratio of forest area to forest appropriation in 14 representative states. There follows a discussion of the activities of the State Forester and possibilities for development.—*James B. Berry.*

2057. SKVORTZOW, B. W. **Notes on the agriculture, botany and zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Abstr. 3, Entry 2462.

2058. STERLING, E. A. **Mandatory control opposed.** Amer. Forestry 25: 1339–1340. 1919.—(A contribution to the general topic "A national forest policy.") It is the opinion of the writer that under the existing political and economic situation a policy aimed at the mandatory acquirement of private lands will fail: (1) because the public has not been convinced that it is necessary; and (2) for the reason that sufficiently strong opposition would immediately develop to not only defeat such a policy, but to jeopardize any forest policy.—*Chas. H. Otis.*

2059. THELEN, ROLF. **Aerial photography and national forest mapping.** Jour. Forestry 17: 515–522. *1 pl.* 1919.—The use of the airplane in forest administration and mapping is described, and its limitations are set forth in detail for various forest activities.—*E. N. Munns.*

2060. Ten Houte de Lange, W. G., Jr. **Rubberproductie-krommen.** [**Rubber production curves.**] Arch. Ruhbercult. Nederlandsch-Indië 2: 105–111. 1918.—This paper presents data and curves showing the falling off in latex production during the so-called "wintering" of Hevea. The latex flow diminishes when the tree begins to lose its leaves, and increases again as the new leaves expand. Production reaches a minimum, on the estate where the data were obtained, in late July and early August. The curve, however, shows a secondary fall in February and March, which the author explains on the basis of local practice with regard to change of the tapping cut. He also suggests that the ripening of the seeds during this period may have something to do with the matter.—*H. H. Bartlett.*

2061. Tireman, H. **Progress report of forest administration in Coorg for 1917–1918.** *18 p.* Bangalore, India. 1919.—A routine annual report. In an experiment to determine what species of evergreen or semi-evergreen trees and shrubs are most suitable for shading the soil in the dry forests of North Coorg the following proved most successful: *Pongamia glabra*, 83 per cent survival, average height 6 feet; *Randia dumetorum*, 77 per cent survival, average height 9½ inches; *Eugenia jambolana*, 54 per cent survival, average height 2 feet. The seed was sown at *Banawara* in 1915.—*E. R. Hodson.*

2062. Trafford, F. **Annual progress report on forest administration in the provinces of Bihar and Orissa for the year 1917–1918.** *53 p.* Patna, India. 1918.—A routine report on forest operations in the province. It is stated that no progress was made in the problem of arresting the destruction of private forests in a certain division (Chota Nagpur). A number of applications for protection were received but none from a private proprietor. It is doubtful whether anything short of specific legislation will prove sufficient for the permanent preservation of privately owned forests which are a most important factor in the future prosperity of the country.—*E. R. Hodson.*

2063. Trägårdh, Ivar. **Skogsinsekternas skadegörelse under ar 1917.** [**Damage by forest insects in 1917.**] Meddel. Statens Skogsförsöksanst. 16: 67–114. *Pl. 1–14.* 1919.—The article gives a survey of the activities of various forest insects in Sweden during 1917. Among the insects discussed are the following: *Scolytus ratzburg, Ips acuminatus, Myelophilus piniperda* and *M. minor, Ips typographus, Bupalus piniarius,* and *Cephaleia signata.* A résumé is given in German.—*G. A. Pearson.*

2064. Van Heurn, F. C. **Natrium sulfeit analyses.** [**Sodium sulphite analyses.**] Arch. Rubbercult. Nederlandsch-Indië 3: 7–16. 1919.—The superiority of sodium sulphite as an anti-coagulant for *Hevea* latex is shown by citing various articles published on this subject. Its anti-coagulant properties are due to the alkalinity of a solution of sodium sulphite. Sodium sulphite has the added advantage of giving disinfecting sulphurous acid on being treated with the acetic acid used for the coagulation of the latex,—hence the growth of microörganisms and the development of air blisters is made impossible. On account of much adulterated and valueless material sold as sodium sulphite, planters are urged to use only the analyzed product. Results on the analyses of 19 different commercial grades of the sulphite are tabulated.—*W. E. Cake.*

2065. Von Greterz. **Das Hagel-, Ton- oder Mändliholz.** [**Treadle-wood. The identification of spruce (Picea excelsa, Lk.)**] Schweiz. Zeitschr. Forstwesen 70: 113–117. 1919.—The identification characters of spruce have been worked out in various ways, but no consistent characters have been found except in some of the varieties. The treadle-wood spruce appears only above an altitude of 1000 m., and the variety *chlorocarpa* is found above 1200 m. above sea-level. Previous investigations which give the color of the leaves, branching habit and bark characteristics have been found to be not always correlated with the wood structure. The characteristics become more definite and pronounced at the higher elevations. Crenations of the wood under the bark have been found as well-defined markings, but these vary in trees growing side by side.—*J. V. Hofmann.*

2066. VON TUBEUF, C. **Schilderungen und Bilder aus nordamerikanischen Wäldern. Von Chicago zum Felsengebirge.** [Descriptions and views of North American forests: from Chicago to the Rocky Mountains.] Naturw. Zeitschr. Forst- u. Landw. 17: 1–44. *Pl. 18–32.* 1919.—Tubeuf presents, in a more or less personal manner, his impressions of American forests and other plant-formations, gained during a tour in 1913. The present article, the second of a series, deals with the region indicated by the sub-title. Conditions in the vicinities of Chicago, Lincoln and Akron (Colorado), are dealt with briefly, but greater space is given to the mountain flora, with special reference to the Pike's Peak region of Colorado. The localities of Minnehaha, the Garden of the Gods, the Peak proper, and the Fremont Experiment Station, are described in considerable detail. Almost every forest and herbaceous species of the region is mentioned. A lengthy description is given of the "blue" Douglas fir typical of this region, which the author calls *Pseudotsuga glauca*. The article is replete with comments, but reaches no important conclusions. Many of the illustrations are half-tones from original photographs by the author.—*C. G. Bates.*

2067. WAENTIG, P. **Zur Frage der Holzaufschliessung zu Futterzwecken.** [Wood preparation for fodder.] Naturw. Zeitschr. Forst- u. Landw. 17: 44–53. 1919. A description of the progress made in the utilization of wood for fodder, mainly since 1916. Describes various theories as to the usefulness and availability of the food stored in wood, recognizing that stem- and branch-wood, on account of greater lignification, may have much less food value than leaves and twigs, which are eaten naturally by stock and have long been cured for fodder. Various means for making the nutricuts available are described, of which the most successful process seems to be a combined mechanical and chemical treatment. Grinding or cutting, as in the preparation of paper-pulp, is of no avail because of the incomplete opening of the cells and the loss of nutrients through the watering which must accompany so intensive a mechanical process. As fodder, wood seems to be especially deficient in proteins, and must be supplemented by some rich food such as animal meal. Its similarity to straw, in this and other respects, is repeatedly mentioned. In spite of its deficiencies, it may be recommended, especially for work-animals, as the rougher part of the ration.—*C. G. Bates.*

2068. WALE, BERNARD N. **The removal of hedgerows.** Jour. Bd. Agric. Great Britain 25: 1408–1424. 1919.—A plea is made for the removal of the too numerous hedgerows surrounding farm fields in England. The loss in land due to the space occupied by these hedges is considerable, being 6 per cent in square fields of 4½ acres in size, and 4 per cent for 10 acre fields. There would be gain in many ways if the fields were enlarged from 4½ acres, which is the average size in some localities surveyed, to 10 acres. Some data are given on the cost of removing the hedgerows.—*M. B. McKay.*

2069. WINEGREN, K. A., AND E. H. **Transportbana för skogsdrift, system Wldegren.** [A transportation system for forest freight, the Widegren system.] Skogsvårdsfören. Tidskr. 17: 199–211. *5 fig.* 1919.

2070. WRIGHT, F. A. **A further note on thitsi (Melanorrhoea usitata).** Indian Forest Records 7: 75–88. *Pl. 1.* 1919.—The apparatus used in tapping thitsi and the methods employed are described. The yields per tree and per chisel are given in local terms, with data on the imports and uses of the oleo-resin derived. Suggestions are made for the regulation and control of thitsi-tapping on government lands.—*E. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

2071. ABE, A., **Goma no nisanno Keisitu no Iden Kenkyu Yohô.** [Preliminary note of inheritance studies on some characters of Sesamum indicum.] [Japanese.] Taiwan Nôzihô [Agric. Rept. Formosa] 153: 15–18. 1919.—Author made experiments on F_1 and F_2 hybrids between some races of *Sesamum indicum*. Seed-coats are white, black, or brown; it was found

that black is dominant to white as well as to brown, and the latter is dominant to white. The mode of segregation of these hybrids in F_2 was not yet definitely determined, but it is very probable that in all these hybrids plants with colored seed-coats and those with non-colored ones segregate out in the ratio 15 : 1. Hybrids were also made between races with branching and non-branching habit; between those with glandular and non-glandular capsules; and between those with bilocular and multilocular capsules; in each of these cases the first-named character was found to be dominant to the second, and all these hybrids were found to behave in F_2 as typical monohybrids.—*S. Ikeno.*

2072. Alzerts, H. W. Work of the Wisconsin Agricultural Experiment Association. *Wisconsin Agric. Exp. Assoc.* [Madison] 1919: 1–28. *21 fig.* 1919.—Outlines method of breeding and dissemination of pure-bred seed grains. Describes pedigreed varieties and gives brief history of same.—*H. K. Hayes.*

2073. Anonymous. Dos nuevas suertes de guisante de los campos obtenidas por seleccion en descendencias puras en Noruega. [Two new types of field peas obtained by pure-line selection in Norway.] Informacion Agric. [Madrid] 9: 11–12. 1919.—See Bot. Absts. 3, Entry 1332.

2074. Anonymous [J. F.]. Variability in plants. Gard. Chron. 66: 26–27. July 12, 1919. —Brief comment on the permanence of characters used in botanical classification in *Fuchsia* and similar genera.—*John Bushnell.*

2075. Anonymous. The genetical society. Gard. Chron. 66: 38. July 19, 1919.—Editorial concerning the establishment of the Genetical Society (England). [See next following Entry, 2076.]—*E. W. Lindstrom.*

2076. Anonymous. The genetical [society]. Gard. Chron. 66: 44–45. July 19, 1919.—Report of the first meeting of the Genetical Society held on July 12, 1919, at Cambridge, England. Includes a general summary of the researches of Miss Saunders on stock (*Matthiola*) and of those of Professor Punnett on sweet pea (*Lathyrus*). [See next preceding Entry, 2075.] —*E. W. Lindstrom.*

2077. Anonymous. The improvement of *Freesias*. Gard. Chron. 66: 95. Aug. 16, 1919. —Refers to article by Van Fleet in Jour. Internat. Gard. Club 3. June, 1919. Author notes that until about 1816 only species in cultivation was *Freesia refracta*, with a rather tortuous, horizontal flower scape bearing five or more blooms, with bulging corolla lobes of lurid greenish color, with a pronounced orange blotch. Forty years later florists had succeeded in producing a greatly improved flower which was nearly pure white with a deep yellow blotch, known as *F. refracta alba*, which became the usual garden variety. Later *F. Leichtlinii* was discovered in an Italian nursery. It was a strong growing plant with well shaped blooms, of color varying from sulphur to deep yellow, with deep orange blotch. From this the golden yellow variety, *F. Chapmanii* was developed. Other crosses and selections show how the type of this plant has departed from that which it originally held. [See Bot. Absts. 3, Entry 2207.]—*C. E. Myers.*

2078. Anonymous. The improvement of the yield of Sea Island cotton in the West Indies by the isolation of pure strains. Agric. News [Barbados] 18: 125. 1919.—Synopsis of paper with same title, by S. C. Harland.—See Bot. Absts. 3, Entry 35.—*T. H. Kearney*

2079. Arny, A. C., and R. J. Garber. Field technique in determining yields of plats of grain by the rod-row method. Jour. Amer. Soc. Agron. 11: 33–47. *2 fig.* 1919.—Rectangular plots of grain 2 by 8 rods in size which had received various fertiliser treatments were sampled by taking out rod-rows at certain intervals distributed systematically over the plots. Yields as determined from entire plots were compared with those obtained from the corresponding rod-rows grouped in various combinations. From a statistical study of the data from three different fields it is concluded that for the conditions under which the work was done, 9 rod-rows removed from tenth-acre plots gave as accurate indications of the value of fertiliser treatments as harvesting the product of the entire plots. [See Bot. Absts. 3, Entry 165; 4, Entry 1133.]—*L. H. Smith.*

2080. ASTLEY, HUBERT D. Hybrid Barraband and Queen Alexandra Parrakeets. Avic. Mag. 10: 212–213. 1919.—*Polytelis Alexandrae* ♀ mated to *P. barrabandi* ♂ produced two young, favoring the father in coloring. Both died before mature plumage was attained.—*J. L. Collins.*

2081. BATESON, W., AND IDA SUTTON. Double flowers and sex linkage in Begonia. Jour. Genetics 8: 199–207. *Pl. 8.* June, 1919.—Double female flowers of *Begonia*, a monoecious plant with terminal male and lateral female flowers, pollinated by strain with only single flowers gave single generally dominant but segregation irregular and not clearly understood. Transitional forms appeared. An average of 1 double in 32 was obtained but many large families were without doubles and the figures are thought to have no general significance. Back crosses were also irregular. Authors noted that while doubleness is distributed genetically according to strict allelomorphic rules in other plants great irregularity prevails in *Begonia*. A pure-breeding single-flowered *Begonia Davisii* from Peru crossed on common doubles gave only double-flowered offspring contrary to usual behavior. Total of 405 plants grown with only 18 having less than complete doubling. Novel conclusion is reached that this pure single-flowered form is genetically all double on male side. Crosses between this Peruvian species and a horticultural type, *B. Lloydii*, having double male flowers which produce pollen, gave no clear indication of linkage of doubleness with sex except in the case of one F_1 plant. This individual self-fertilized gave only two plants, both singles. Pollinated by the single *Davisii* it gave 11 singles, and by the double *Lloydii* 5 singles and 1 slightly petalodic. Used as pollen parent it gave with *Lloydii* 27 doubles, 14 half doubles and 5 slightly petalodic. Hence the ovules at least were predominantly single-bearing. Sex linkage in *Petunia*, *Matthiola*, *Campanula* and *Oenothera* is also discussed.—*D. F. Jones.*

2082. BAUR, ERWIN. Über Selbststerilität und über Kreuzungsversuche einer selbstfertilen und einer selbststerilen Art in der Gattung Antirrhinum. [On self-fertility and crossing experiments with a self-fertile and self-sterile species of Antirrhinum.] Zeitschr. indukt. Abstamm. Vererb. 21: 48–52. May, 1919.—The several species of *Antirrhinum* investigated varied in regard to self-sterility. *A. siculum* and *A. majus* were perfectly self-sterile. While *A. latifolium* and *A. tortuosum*, except for the occasional setting of seed late in the season, were sterile with their own pollen during their first year, they were self-fertile the next. An undetermined variety of the latter was self-sterile in the first generation but self-fertile in succeeding generations. *A. Ibanyezii*, *A. molle*, *A. glutinosum*, and *A. hispanicum* were self-sterile.—Hybrids between self-sterile species were all self-sterile. In hybrids between self-fertile and self-sterile species self-fertility is dominant, a 15 : 1 ratio resulting in F_2.—*E. S. Anderson.*

2083. BAYLA, A. M. Hybridization of eggplants. Philippine Agric. 7: 66–71. 1918.—Shows possibility of crossing native on foreign varieties, giving increased vigor in the hybrid. The hybrid is quite resistant to bacterial disease, but this character was lessened in the second generation. Commercial possibilities of the work are noted.—*C. B. Myers.*

2084. BECKING, L. G. M. BAAR. Over getallenverhoudingen in panmictische populaties. [Numerical conditions in panmixial populations.] Nederland. Kruidkundig Arch. 1918: 61–69. May, 1919.—Genetic formulae are given or suggested for the Mendelian principles as applied to factors of human population. There is a discussion of the various formulae applied by previous writers with criticisms and the opinion of the author tends towards an expectation of results pointing to equilibrium of factors as inferred by deduction.—*J. A. Nieuwland.*

2085. BECKING, L. G. M. BAAR. Some numerical proportions in pan-mictic populations. Recueil Trav. Bot. Néerland. 15: 337–366. *1 pl.* 1918. Panmictic populations are those in which mating between the different genotypes is free and unrestricted. HARDY showed that with one factorial difference a constant limit is reached in F_2. With more numerous factors the limit is reached only after numerous generations. Formulae are derived for these cases and it is

shown that: (1) A limiting population will be reached in all cases, which will thereafter remain constant; (2) The limiting population had the peculiarity that the homozygotes in it will be proportional to each other in pairs; (3) Such populations have other numerical peculiarities. The importance of these results to practical breeding is pointed out and a method formulated by which it is possible to derive immediately the limiting proportions in a population when the number of factors and the type of mating is known.—*L. Baas Becking.*

2086. Becking, L. G. M. Baas. **Over Limietverhoudingen in Mendelsche populaties. [Limiting proportions in Mendelian populations.]** Genetica 1: 443–456. *4 fig.* Sept., 1919.—Reviews papers by Jennings, Henkels, Wentworth & Remick, Hardy, Bruce, and Robbins. Formulae are derived and graphs constructed to homologize the work of these authors for: (1) Panmixia for 1, 2 and 3 factors (Hardy, Becking); (2) Autogamy for 1 or more factors (Jennings); (3) Combined allogamy and geitonogamy for 1, 2, and 3 factors (Henkels and (4) Different forms of selective mating (Bruce, Robbins, Wentworth and Remick. From the formulae and graphs the limiting proportions in any population in which the type of mating is known can be easily and immediately derived. As shown by the graphs the rate at which the limits are approached varied widely with the type of mating.—*L. Baas Becking.*

2087. Beeson, M. A. **Report of agronomy department.** Oklahoma Agric. Exp. Sta. Rept. 1918: 14–22. 1918.—Progress report of selection experiments and variety tests with farm crops. States that improved seed distributed through Oklahoma Seed Growers' Association has materially increased yields and improved quality.—*H. K. Hayes.*

2088. Hilde, R. K. **Probable material for the study of the experimental evolution of Oryza sativa, var. plena Prain.** Agric. Jour. India 14: 494–499. 1919.—*Oryza sativa*, var. *plena* Prain, the "double-grain paddy" is a variety of rice cultivated in Bengal. Usually a certain proportion of the spikelets of the panicle contain from 2 to 5 grains each. Almost every spikelet has from 2 to 5 ovaries in the flowering stage. The number of well developed grains per spikelet is often only from 1 to 3; as probably all of the ovaries are not in a stage to be fertilized at the same time. In a plot of this variety, it was found in rare instances, that the topmost spikelets on a few branches of the panicle had only a single ovary with 4 or more stigmas, two or more ovaries being then united together. The number of stamens in each spikelet is usually 6, but in rare instances it was found to be 7 or 8, thus indicating a slight tendency in the stamens to increase their number. Sometimes the spikelets showed a tendency to increase the flowering glumes and pales. A few plants showed a slight tendency to form clusters of spikelets near the tips of the branches. In ordinary rice the spikelets consist of two small empty glumes which stand on the outside of the remaining flowering glume, and glume-like pale, which normally encloses two lodicules, six stamens, and a solitary pistil, with two styles and hairy stigmas. Whether these overlapping variations are due to some temporary disturbance in the plants, caused by an abnormal season, or they are the beginnings of progressive changes, has yet to be proved. It is probable that the production of the additional flowering glumes, pales, stamens, etc., but the double grain paddy might be a retrograde step. The author is looking for other stages in order to bring about an experimental evolution of the double grain paddy from the ordinary variety without the help of crossing.—*F. M. Schertz.*

2089. Blackwell, C. P., and R. E. Currin. **Work with field crops in South Carolina.** South Carolina Agric. Exp. Sta. Rept. 1918: 18–20, 38–39, 40, 41. 1918.—Progress report of variety tests and selection experiments. Found pollen from barren stalks gives progeny with a ratio of 1 barren to 2.56 normal stalks.—*H. K. Hayes.*

2090. Bos, J. Ritzema. [Rev. of: Marissen, J. Z. **Ten Rodengate. Algemeene Plantenteelt. (General plant breeding.)** 5 ed., revised by J. Elema. J. B. Wolters: Groningen. 1919.] Tijdschr. Plantenz. 25: 159–160. 1919.

2091. Bouquet, A. G. B. **Pollination of tomatoes.** Oregon Agric. Exp. Sta. Bull. 157, 23 p., 5 fig. 1919.—Author notes fact that when tomatoes are grown under glass unfavorable environmental conditions, such as absence of insects, relation of several reproductive organs to the development of the flower, and the correlation of the vegetative and reproductive systems of the plant, contribute to unfruitfulness which varies from 48 to 79 per cent. By hand-pollinations, in which the blossoms were emasculated, and pollen applied artificially, 72 per cent of fruitfulness was obtained. Hand-pollinations also increased the earliness of fruiting by 21 days. [See Bot. Absts. 3, Entry 2385.]—*C. E. Myers.*

2092. Bridges, Calvin B. **Specific modifiers of eosin eye color in Drosophila melanogaster.** Jour. Exp. Zoöl. 28: 337–384. July 5, 1919.—Demonstration has been made of eight mutant genes which by themselves produce little or no effect upon eye color of flies homozygous for them, yet which modify eye color of sex-linked mutant "eosin." These "specific" and "disproportionate" modifications are clear and simple cases of "multiple genes." Each is the result of coaction of a specific modifying gene (cream a, cream II, dark, whiting, cream III, cream b, pinkish, cream c) and of a particular gene (eosin) which latter is necessary as a "base" or "differentiator." The scale of modifications of eosin produced by these several modifiers ranges on the one hand to a deep pink darker than "eosin," and on the other to a pure white. In origin these modifiers were entirely independent of one another, and the order of their occurrence bears only a random relationship to the dark-light seriation. The main significance of the facts presented is in their bearing on the question of method by which selection attains its results.—*Calvin B. Bridges.*

2093. Bridges, Calvin B., and Otto L. Mohr. **The inheritance of the mutant character "vortex."** Genetics 4: 283–306. *1 fig.* May, 1919.—The character "vortex," affecting thorax of *Drosophila melanogaster*, depends primarily on two mutant genes—one in second chromosome (vortex II) and one in third chromosome (vortex III). Male flies must be homozygous for vortex *II* and for vortex *III* to show the character; but a small proportion of such males nevertheless fail to show it. Vortex females must also be homozygous for vortex II and generally for vortex *III*; but about 20 per cent of females homozygous for vortex II show the character when only heterozygous for vortex III. The proportion in which vortex III is dominant is increased by a third modifier (probably also in the second chromosome) which acts as a dominant sex-limited intensifier. The factor streak inhibits the appearance of the vortex character; but still another factor, located very near streak in the second chromosome, allows the appearance in streak flies of a vortex of a somewhat altered type.—*Alexander Weinstein.*

2094. Bridges, Calvin B. **Maroon—are current mutation in Drosophila.** Proc. Nation. Acad. Sci. 4: 316–318. Oct., 1918.—The recessive eye-color mutation "maroon" has recurred independently at least four times, a phenomenon since found in several other loci. Located in third chromosome at locus 15.2. Maroon and "pink" are "non-modifiers" of each other, as most pink eye-colors have since been found to be. Third independent mutation to maroon occurred in chromosome already carrying new mutation "dwarf" and a gene with specific effect on crossing-over in third chromosome, probably identical with previous mutation "III". In "dichaete" region (including maroon) there is no great difference between homozygous and heterozygous CIII conditions. Detailed data will appear in Carnegie Institution Publication 278.—*C. R. Plunkett.*

2095. Brotherton, W. E. **Note on inheritance in Phaseolus.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 152. 1919.—*P. vulgaris* (dwarf variety) × *P. multiflorus* (tall variety) in F_1 showed 50 per cent decrease in length of hypocotyl, 100 per cent increase in length of epicotyl compared with *P. vulgaris*; cotyledons epigeal, plants dwarf. Tschermak found hypogeal cotyledons dominant. Cotyledons epigeal or hypogeal is not important. Genetic factors concern length of hypocotyl.—*W. E. Brotherton.*

2096. Burger, Owen F. **Sexuality in Cunninghamella.** Bot. Gaz. 68: 134–146. Aug., 1919.—Author has tabulated the sexual activity of 25 or 26 races of *Cunninghamella bertholletiae* as shown by the presence or absence of zygospore formation when 5 of these races were

used as testers. Author's summary follows: "1. In *Cunninghamella* there does not exist sexual dimorphism.—2. *C. echinulata* plus and minus, or *Mucor* V plus and minus as separated by Blakeslee, are unable to form progametes or gametes when contrasted with any one of 26 cultures of *C. bertholletiae*.—3. Many of these cultures of *C. bertholletiae* were able to form zygospores when contrasted with certain other cultures of this same species.—4. There exists a selective power in some strains to form zygospores with certain other strains. This condition of pseudo-heterothallism cannot be explained at present.—5. There exists a condition in some strains which might be called hermaphroditism.—6. In none of the hermaphrodite strains did branches of the hyphae conjugate.—7. Zygospores were produced only when 2 strains were contrasted whose gametes were compatible."—*A. F. Blakeslee.*

2097. Byrnes, Esther F. **Experiments in breeding as a means of determining some relationships among Cyclops.** Biol. Bull. 37: 40–49. *3 pl.* July, 1919.—Author seeks by examination of adults and of the different developmental instars to settle the question as to the validity of the two common forms "*Cyclops signatus* var. *coronatus* (*C. fuscus* Jurine) and *Cyclops signatus* var. *tenuicornis* (*C. albidus* Jurine)." Author finds certain adult characters distinct for the two forms and for the immature stages mentions the presence on the fourth swimming feet of a certain seta in a fully developed condition (together with a hairiness at the base of the segment having this seta) in the one form, and small or absent (together with a lack of the hairiness) in the other form. She finds these differences constant in generation after generation of her cultures.—*A. M. Banta.*

2098. Clute, Willard N. **Age and protoplasm.** Amer. Bot. 25: 107–108. 1919.—Commenting on the contention of Casper L. Redfield that the protoplasm of animals improves as it grows older, it is pointed out in support of this theory that, in the peony, pink daisy (*Pyrethrum hybridum*), and some melons, the characters of the flowers and seeds are influenced by the age of the plant. Doubling in peony and pink daisy is a matter of progression for several years.—*W. N. Clute.*

2099. Cobb, Frieda, and H. H. Bartlett. **A case of Mendelian segregation in Oenothera pratincola.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 151. 1919.—This is a preliminary abstract of: Cobb, Frieda, and H. H. Bartlett. **On Mendelian inheritance in crosses between mass-mutating and non-mass-mutating strains of Oenothera pratincola.** Jour. Washington Acad. Sci. 9: 462–483. Oct. 4, 1919. [See next following Entry, 2100.]—*H. H. Bartlett.*

2100. Cobb, Frieda, and H. H. Bartlett. **On Mendelian inheritance in crosses between mass-mutating and non-mass-mutating strains of Oenothera pratincola.** Jour. Washington Acad. Sci. 9: 462–483. Oct. 4, 1919.—In crosses between *Oe. pratincola* mut. *formosa* (true-breeding, revolute-leaved mutation from *Oe. pratincola* strain E) and f. *typica* strain E inheritance is matroclinic. *Oe. pratincola* strain C pollinated by mut. *formosa* gives a matroclinic progeny. Mut. *formosa* pollinated by strain C gives, in the F_1, f. *typica*, in the F_2 Mendelian segregation of 3 f. *typica*: 1 mut. *formosa* (the latter breeding true, and, of the former, one third breeding true, two thirds repeating the splitting.)—Explanation offered: two types of gametes occur in *Oe. pratincola*, α (usually female) and β (usually male), the α carrying some character determiners not represented in the β. Mut. *formosa* arose from f. *typica* strain E by loss of the factor for flatness in the α portion of the α gamete. Therefore, change being in the α (female) gamete only, inheritance is matroclinic in crosses between mut. *formosa* and f. *typica* strain E. Strain C differs from strain E in having, in addition to the factor for flatness in the α portion of the α gamete, a Mendelian factor for flatness, present in both α and β gametes. Therefore strain C × mut. *formosa* gives a progeny of f. *typica* which breeds true (α gamete concerned was normal), while mut. *formosa* × strain C gives a progeny of f. *typica* which splits in the next generation (α gamete concerned had lost the factor for flatness, allowing the F_2 individuals which were recessive for the Mendelising factors for flatness to show the revolute-leaved character. Restated,

strain C	$\alpha\beta FF$,	flat, and, with respect to this character, immutable.
strain E	$\alpha\beta ff$,	flat, mutable.
mut. *formosa*	$\alpha'\beta ff$,	revolute-leaved.
strain E × *formosa*	$\alpha\beta ff$,	flat, mutable.
formosa × strain E	$\alpha'\beta ff$,	revolute, breeding true with respect to this character.
strain C × *formosa*, F_1	$\alpha\beta Ff$,	flat, segregating with respect to mutability.
strain C × *formosa*, F_2 1	$\alpha\beta FF$,	flat, immutable, breeding true.
strain C × *formosa*, F_2 2	$\alpha\beta Ff$,	flat, continuing the segregation of the F_1.
strain C × *formosa*, F_2 1	$\alpha\beta ff$,	flat, mutable, otherwise breeding true.
formosa × strain C F_1	$\alpha'\beta Ff$,	flat, segregating with respect to revoluteness.
formosa × strain C F_2 1	$\alpha'\beta FF$,	flat, non-segregating.
formosa × strain C F_2 2	$\alpha'\beta Ff$	flat, continuing the segregation of the F_1.
formosa × strain C F_2 1	$\alpha'\beta ff$,	revolute, breeding true.

—*Prieda Cobb.*

2101. COCKERELL, T. D. A. Hybrid sunflowers. Nature [London] 102: 25–26. 1918.—Results of hybridization in *Helianthus*: (1) varieties of *annuus* (including *lenticularis*) crossed together give fertile hybrids; (2) interspecific hybrids between annual species; viz., *annuus* crossed with *argophyllus*, *petiolaris*, and *cucumerifolius*, are nearly completely sterile; (3) interspecific hybrids between annual and perennial species resemble one parent. Hybrid previously reported between *pumilis* and *annuus* is hybrid of *subrhomboideus* and *annuus*. Brief discussion of interpretations of interspecific hybrid behavior.—*R. E. Clausen.*

2102. COLE, LEON J., AND FRANK J. KELLY. Studies on inheritance in pigeons. III. Description and linkage relations of two sex-linked characters. Genetics 4: 183–203. Mar., 1919.—Two sex-linked characters of domestic pigeon have been studied, namely intensity of pigmentation (factor *I*), and an alteration in the appearance of black pigment (factor *A*). The *A* factor has variable effect on color of bird, differences depending, presumably, upon combinations of individual factors. There are apparently two main categories, dominant red and gray. The dominant red presents an interesting contrast with the recessive red described in previous publications. In the case of *I*, while the results were in accord with expectation as to the association of character with sex, there was a considerable disturbance of the sex ratio, the males being much in excess of expectation. This seems to be due largely to excess of males in particular families, and may be the result of a recessive sex-linked lethal factor. In the matings involving the *A* factor there was a deficiency rather than an excess of males. No explanation is apparent. The two sex-linked factors *I* and *A* show slight but appreciable mutual linkage. Crossing over in the male occurs in roughly 40 per cent of the cases; there is no crossing over in the female.—*Philip Hadley.*

2103. COLLINS, E. J. Sex segregation in the Bryophyta. Jour. Genetics 8: 139–146. *Pl. 6, 5 fig.* June, 1919.—Author sowed 3 cultures of *Funaria hygrometrica* (monoecious): (1) from antheridia taken from single male "flower"; (2) from perigonial leaves of male flower; (3) from spores shed from one ripened capsule. Gametophytes from (3) were bisexual; those produced vegetatively from (1) and (2) showed antheridia only. Suggests possible origin of dioecism through somatic segregation in, and vegetative multiplication from, gametophyte tissue. Discusses related work of the Marchals, Douin, Allen.—*Merle C. Coulter.*

2104. COLLINS, J. L. Chimeras in corn hybrids. Jour. Heredity 10: 2–10. *7 fig.* Jan., 1919.—An article dealing with the occurrence of chimeras in certain plants and their possible explanation. Grains of hybrid corn are reported in which xenia occurs only in a portion of the aleurone layer, others having sweet patches in the starchy endosperm. The theory of independent development of the second pollen tube nucleus and the endosperm nucleus is assumed by Correns and Webber. In the present case it cannot hold because the purple half of the seed should have had sweet endosperm, since the factor for purple aleurone and the factor for sweet endosperm were carried in the same nucleus. East and Hayes suggest Mendelian

segregation in somatic tissue which Babcock and Lloyd show to be impossible since separation of chromosomes occurs in heterotypic mitosis and does not normally occur during division of somatic cells. A more probable explanation is a factor mutation occurring in a single somatic cell such that all cells descending from the mutated cell would produce the chimera. The same theory applies to phenomena which occur in many plant genera. Among the F_2 grains of the cross, Extra Early Adams white dent corn with Black Mexican sweet corn a half purple and half white sweet grain was found. If the progeny from this grain gives evidence that the embryo is homozygous for the purple color, then the chimera can only have come about by somatic mutation. [See Bot. Abstr. 2, Entry 930.]—*M. J. Dorsey.*

2105. Correns, C. **Die Absterbeordnung der beiden Geschlechter einer getrenntgeschlechtigen Doldenpflanze (Trinia glauca).** [Order of death of the two sexes in a dioecious umbelwort (Trinia glauca).] Biol. Zentralbl. 39: 105–122. *3 fig.* Mar., 1919.—Dioecious, biennial *Trinia glauca* shows one-to-one sex ratio just before bloom. Before this, mortality of males and females is equal. With beginning of bloom the death rate of males becomes nineteen times death rate of females. Since this ratio remains constant throughout period of bloom, death cannot be due to completion of life cycle but to differences in resistance to disease observed in both sexes.—*Helene Boas Yampolsky.*

2106. Cowgill, H. B. **Cross-pollination of sugar cane.** Jour. Amer. Soc. Agron. 10: 302–306. 1918.—This paper contains a brief historical review of methods used in breeding sugar cane. The difficulty of emasculating sugar cane flowers and securing crosses by hand-pollination is explained and several methods used by others to secure cross-pollination are mentioned. The method devised by the author for use in Porto Rico is described: cheese cloth bags, 18 inches in diameter and 48 inches long, and held extended by heavy wire rings are placed over the panicles. One ring is placed at the upper end of the bag and the other 16 inches from the lower end. This 16 inch apron may be drawn together around the stem below the panicle and tied so as to keep out undesirable pollen. The bags are supported by bamboo poles and placed in position when panicles first appear. Some varieties of cane are almost completely self-sterile. On account of this fact it is possible to cross them by placing the panicle of some other variety in the bag in position so that the pollen when shed will be carried to stigmas. Several different crosses and combinations have been made in this way and a thousand or more hybrid seedlings secured each year for three years. That these seedlings were true hybrids was evidenced by the fact that characters of both parents were found combined in them.—*H. B. Brown.*

2107. Cowgill, H. B. **Studies in inheritance in sugar cane.** Jour. Dept. Agric. Porto Rico 2: 33–41. 1918.—Seedling sugar canes show a certain degree or resemblance to their parents, particularly in regard to color. There is wider variation in seedlings than in plants from cuttings of the same variety. Certain varieties produce better seedlings than others, and some produce a larger percentage of abnormal seedlings. In crosses a recombination of characters of the parents appears to be produced in some seedlings. This is considered to be due to dominance of certain characters derived from each parent. Only slight difference in sugar content has been observed between groups of seedlings produced from different varieties.—*S. C. Harland.*

2108. Danbishire, F. V. **Sugar beet seed.** Jour. Soc. Chem. Ind., Rev., 38: 21. 1919.—Danger of depending on a foreign country for essential raw materials illustrated by fact that in United States the beet-sugar industry needs annually about 6000 tons of seed, 4000 tons of which was formerly brought from Germany. Progress in seed production in this country since 1915 is noted, production in 1917 reaching 2773 tons. German grades of super-élite, élite and commercial seed are described. Reason for requirement of five years (in Europe and eastern America) is explained. Effort to develop sugar beets with single-germ seed-balls is mentioned; also importance of working for disease resistance.—*E. B. Babcock.*

2109. Davis, Bradley M. **The segregation of Oenothera brevistylis from crosses with Oenothera Lamarckiana.** Genetics 3: 501–533. *7 fig.* Nov., 1918.—Plants of F_1 generations of reciprocal crosses between *Oenothera Lamarckiana* and *Oenothera brevistylis* (true-breeding mutation from *Oe. Lamarckiana*) are *Lamarckiana*. F_2 generations show sharp segregation of *brevistylis* plants from *Lamarckiana*, approximately in Mendelian ratio 3 *Lamarckiana* : 1 *brevistylis*. Double reciprocal crosses give 3 : 1 ratio. Back crosses of reciprocal F_1 hybrids to *Lamarckiana* give *Lamarckiana;* to *brevistylis* give segregation approximating 1 : 1. Departures from expected ratios—too few *brevistylis*—are correlated with lower percentage of viable seed, showing selective mortality due to environment. Seed forced to complete germination in Petri dishes gives higher germination than that sown in soil, but as much irregularity in ratios. Twelve tables present data of experiments. Characters of *brevistylis* are inherited as a unit. Selection toward better development of pistil in *brevistylis* has been started.—*Frieda Cobb.*

2110. de La Vaulx, R. **Observations sur l'apparition des daphnies gynandromorphes. [Observations upon the appearance of gynandromorphous daphnids.]** Bull. Soc. Zool. France 43: 187–194. *2 fig.* 1918.—Continuing his description (*Ibid.* 40: 191–197, 1910) of what he calls gynandromorphs of *Daphnia atkinsoni* the author refers to 24 additional such individuals (14 having been described in earlier papers). With one exception these abnormal individuals arose in the spring or early summer in successive years, 1915 to 1918, from poorly nourished stock. Part of these were from descendants of earlier sex intergrades. All parts of the body capable of sexual modification showed various intermediate sex conditions, but the antennules were more frequently modified. The different abnormal females (all possessed ovaries) had secondary sex characters of various degrees of maleness and femaleness. Frequently in a single individual certain characters were fully male, others slightly or moderately male and some fully female. Author cites the occurrence of two ephippial intergrades and the production of two normal female young from ephippial eggs of one of these as showing the independence of the secondary sexual characters and the gonads.—Author concludes that the eggs of *Cladocera* which without fertilization produce females, males, and all conceivable intermediate types, indicate that notwithstanding the favor enjoyed by the chromosome theories the problem of sex determination preserves all its complexity.—*A. M. Banta.*

2111. de Vries, Hugo. **Twin hybrids of Oenothera Hookeri T. & G.** Genetics 3: 397–421. Sept., 1918.—Investigations of crosses between *Oe. Hookeri* T. & G. and the mutating species of *Oenothera* throw light upon the rôle of lethal factors and hybrid mutants in splitting phenomena of normal mutations. *Oe. Hookeri* is an isogamic species. *Oe. grandiflora* splits into (1) type and (2) *Oe. grandiflora* mut. *ochracea*, a pale race. *Oe. grandiflora* × *Oe. Hookeri*, and reciprocal cross, produce *laeta* (59 per cent) and *velutina* (41 per cent). Mut. *ochracea* × *Oe. Hookeri* gives *laeta*. *Laeta*, then, is produced by fertilization of mutated gametes and *velutina* by non-mutated sexual cells. *Laeta* splits into *laeta* (60 per cent) and *velutina* (40 per cent) when self-fertilized. Reciprocal crosses, *laeta* × *velutina* and *laeta* × *Hookeri* show *laeta* to be isogamic. Selfed *velutina* gives constant progeny splitting only in character for size of flowers, small flowers (27 per cent) recessive.—In crosses with *Oe. grandiflora*, *Oe. franciscana* (Bartlett 1914) behaves as *Oe. Hookeri*. *Oe. Lamarckiana* behaves as *Oe. grandiflora* in crosses with *Oe. Hookeri*, a fact explained by assuming mass mutation into *Oe. Lamarckiana* mut. *velutina* (*Oe.* mut. *blandina*) for *Oe. Lamarckiana*. Absence of a lethal factor in all crosses is shown by the high percentage of *velutina* in the progeny and the very small percentage of empty seeds in *laeta*. *Oe. franciscana* behaves as *Oe. Hookeri* in crosses with *Oe. Lamarckiana*.—*Oe. biennis* Linn. × *Oe. Hookeri* gives constant progeny. *Oe. Hookeri* × *Oe. biennis* gives *rubiennis* which splits into (1) *rubiennis* and (2) *Hookeri* type in F_2. In F_2 et seq. *Hookeri* is constant, *rubiennis* continuing unilateral splitting. Heterogamy of *Oe. biennis* is tested by the crosses *Oe.* (*syrticola* × *biennis*) × *Oe. Hookeri* and *Oe.* (*biennis* × *syrticola*) × *Oe. Hookeri*. The offspring correspond, respectively, to those of *Oe. biennis* × *Oe. Hookeri* and *Oe. syrticola* × *Oe. Hookeri*, the characters of the pistillate parent of the original crosses being eliminated. No conclusion is drawn; explanation by means of lethal

factors is suggested. *Oe. franciscana* and *Oe. Lamarckiana* mut. *velutina* behave as *Oe. Hookeri* in crosses with *Oe. biennis*. *Oe. suaveolens* behaves as *Oe. biennis* in crosses with *Oe. Hookeri* with following exceptions—appearance in *rubiennis* F_1 of a narrow-leaved (constant) mutant and in F_2 of mutants (1) *lutescens*, (2) small-leaved, and (3) *aurea*, showy race with golden foliage.—*Oe. Cockerelli* in all crosses fails to produce the splitting hybrids characteristic of *Oe. Hookeri* crosses.—*Oe. Hookeri* T. & G., *Oe. franciscana* (Bartlett) and *Oe. Lamarckiana* mut. *velutina* (*Oe.* mut. *blandina*), three large-flowering species, produce splitting *laeta* and splitting *rubiennis*. These split into (1) splitting type and (2) type of other grandparent. *Laeta* and *rubiennis* are constant in no observed case. Apart from rare Mendelian segregation, other *Oenothera* hybrids are constant.—*Paul A. Warren.*

2112. de Vries, Hugo. **Oenothera Lamarckiana mut. simplex.** Ber. Deutsch. Bot. Ges. 37: 65–73. May 15, 1919.—In 1906 author observed a new mutant form in a pure bred family of *Oenothera Lamarckiana* mut. *oblonga* which in many respects paralleled his *Oe. Lamarckiana* mut. *velutina* (syn: *Oe. blandina*). Like the latter, it yielded very few sterile seeds (about 87 per cent with living germs) and produced twin forms when crossed. The new type, which he calls *Oe. Lamarckiana* mut. *simplex*, is regarded as an important one, since, unlike *Oe. velutina*, it has retained the mutability of *Oe. Lamarckiana*. In a culture of 2000 seedlings of the fourth generation derived from pure-bred seed, he recognized the following mutants: *semigigas nanella, lata, scintillans, linearis, deserens, metallica* and *secunda;* essentially the same mutants as produced by the mother species. Though *Oe. rubrinervis* and *Oe. oblonga* were absent, *Oe. deserens*, another brittle form, appeared in the place of the former, and *Oe. metallica* in the place of the latter. Author discusses the gametic origin of *Oe. Lamarckiana*, *Oe.* mut. *simplex* and several derivatives of each, concluding that the former arose through mutation and is not hybrid resulting from a cross between two earlier races; also that *Oe.* mut. *simplex* is a homozygous, mutating race.—*Anne M. Lutz*

2113. de Vries, Hugo. [Rev. of: Ernst, Alfred. **Bastardierung als Ursache der Apogamie im Pflanzenreich.** (Hybridization as the cause of apogamy in the plant kingdom.) 8vo, xv + *660 p., 8 pl., 172 fig.* Gustav Fischer: Jena, 1918.] Science 49: 381–382. April, 1919. —Some investigators assume that one of the chief causes of mutation is to be looked for in crossing, while others think that crosses are too rare in nature to have had any appreciable effect in the production of new species, except for the polymorphous genera. The best way to decide the question is to study the influence of hybridizing on the origin of a new character, viz., apogamy, by means of artificial crosses. The book gives a full description of all known cases of apogamy, including algae, fungi, *Marsilia*, *Antennaria*, *Alchemilla* and *Hieracium*. The doubling of chromosomes, the terminology of parthenogenesis, nucellar embryos, lessened fertility and many other effects of hybridizing and vegetative propagation are extensively dealt with. The author concludes that *Chara crinita* seems to afford the best material for further studies, and he gives a review of the mode of propagation of this alga. [See also Bot. Abstr. 3, Entry 2151.]—*A. H. Chivers.*

2114. de Vries, H. **Halbmutanten und Massenmutationen.** [Half-mutants and mass mutations.] Ber. Deutsch. Bot. Ges. 36: 193–199. 1918.—No species or varieties have been proved to have been produced by fluctuating variations. Certain mutations are established (investigations of Baur, Cockerell, Babcock and Morgan cited). Mass mutation and half-mutants are assumed to be the starting point of these mutations. Mass mutation is the production of new types, not in 1 per cent or less, but in higher percentages of the progeny. Author assumes certain gametes to be mutated before fertilization (premutation). Thus an individual mutant is produced by the fusion of two mutated gametes, a half-mutant by the fusion of a mutated with a normal gamete. Half-mutants split in true Mendelian fashion. *Oenothera gigas* selfed gives constant dwarf types in 1–2 per cent of offspring. Remainder of progeny is (1) pure *gigas* type and (2) half-mutants which, when selfed, split into (1) pure *gigas*, (2) half-mutants and (3) pure dwarfs in a 1 : 2 : 1 ratio. Half-mutants are thus hybrid-mutants but from gametes of the same origin. Baden corn, which for six generations

showed no unbranched progeny, produced in the seventh generation 40 in 340 (12 per cent) unbranched individuals with undeveloped panicles (mass mutation). Progeny from these were unbranched in 19 per cent of cases. It is assumed that in the fifth generation a gamete mutated and mated with a normal gamete producing a half-mutant in the sixth which, by splitting, gave the pure mutants in the seventh generation. In the production of albino forms by mass mutation (percentages noted for four species) half-mutants (green forms) are also produced which segregate in Mendelian fashion.—In dioecious and self-sterile plants the relationships are more complicated. Seven species were investigated by the writer, especially the self-sterile *Linaria vulgaris* in which peloric forms appear sporadically in nature. In this case the fifth generation shows 1 per cent of completely peloric forms. Assume mutated gametes in the third, or earlier generation, half-mutants in the fourth and mutants in the fifth produced by half-mutant × half-mutant. Here again half-mutants are recognizable only by their progeny on account of the dominance of the original pure type. An analogous case is that of the production of doubles in *Chrysanthemum segetum*.—In MORGAN's investigations upon *Drosophila ampelophila* over 100 mutations have appeared but in small percentages. Assume premutation to produce half-mutants which when fertilized by half-mutants give rise to mutant types. Premutations or "inner" mutations, are often very complicated but the principle remains the same. The explanation of the original mutation of the gametes is not yet forthcoming.—*Paul A. Warren.*

2115. DUDGEON, G. C. **The maintenance of the quality of Egyptian cotton.** Bull. Imp. Inst. (South Kensington) 16: 160–170. 1918.—Varieties of cotton in Egypt are stated to have arisen from individual plants (possibly mutants) selected for superior qualities and are believed to have bred true until exposed to crossings with other varieties. Cross-pollination and mixing of seed at gins are considered responsible for rapid loss of uniformity, which makes continuation of industry dependent upon appearance, at frequent intervals, of new varieties. Author discusses practical measures for maintaining purity of varieties grown.—*T. H. Kearney.*

2116. DUERDEN, J. E. **Breeding experiments with North African and South African ostriches. IV. Increasing the number of plumes: degeneration and restoration.** Union of South Africa Dept. Agric. Bull. 7. *39 p., 12 fig.* 1918.—Wild ostriches of northern Africa and strains long under domestication in the south, agree in having from 33 to 39 remiges on each wing. The mean for each group falls between 36 and 37, but there is evidence of several distinct biotypes both in northern and southern stocks. These biotypes represent various stages of degeneration. Fortunately one surviving specimen with the original number of 42 primaries has been found and proved to transmit the tendency to high feather production. The author confidently predicts that it will now be possible to disseminate this trait and very materially increase the commercial value of the annual crop of plumes.—*C. H. Danforth.*

2117. DUERDEN, J. E. **Some results of ostrich investigations.** South African Jour. Sci. 15: 247–284. *4 pl., 4 fig.* Nov.–Dec., 1918.—An account of the characteristics, habit, and general biology of the ostrich, with observations on the genetic behavior of various traits, and a critique on the systematic status of *Struthio camelus* and *S. australis*. Descended from more fully endowed ancestors, the ostrich is a form in which some intrinsic influences at work in the germ plasm cause successive mutations that tend to be predominantly in one direction. These mutations by short steps are denuding the bird of its plumage and gradually eliminating its wings and toes. While in no sense adaptive, the degenerative changes have not been as yet particularly disadvantageous, but they can not proceed farther without becoming so, and if the present tendency remains unchecked the genus must in a (geologically) short time become incapable of further existence. It is pointed out that this genus offers exceptional material for the study of degeneration from the point of view of genetics. A physiological observation of interest is the fact that the red and blue skin color of the male is due to presence of testes while his black plumage is due to absence of ovaries.—*F. G. Danforth.*

2118. Duerden, J. E. **Crossing the North African and South African ostrich.** Jour. Genetics 8: 155–198. *Pl. 7, 2 fig.* June, 1919.—Hybrids between North and South African ostriches are intermediate between the two parents except that baldness of the northern form is completely dominant. The limited data indicate that in F_2 various original traits tend to segregate in true Mendelian fashion. Blending in F_1 is attributed to interaction in the hybrid germ plasm of homologous, but still not quite identical, genes. In this paper the author still further elaborates his view that in all ostriches, perhaps in the Ratitae as a whole, there is some inherent degenerative tendency that manifests itself through successive small mutations, affecting particularly feathers, wings and toes. Emphasis is laid upon the point that, while the usual evolutionary conception of mutation is one of fortuitous discontinuity, studies of the ostrich show that "discontinuous changes in the individual may proceed along definite lines and result in determinate continuous evolution for the race as a whole."—*C. H. Danforth.*

2119. Easlea, Walter. **Mildew resistant roses: with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. 43: 253–260. 1919.—Author notes that many of our present hybrid varieties owe their weakness to one or the other of the parents. Urges more care in selecting of resistant parents, also growing of seedlings from desirable varieties which are resistant. Gives list of varieties which are more or less mildew-resisting. [See Bot. Abstr. 3, Entry 2256.]—*C. E. Myers.*

2120. East, E. M. **Studies on self-sterility. III. The relation between self-fertile and self-sterile plants.** Genetics 4: 341–345. July, 1919.—Summary of the self-sterility (of the type due to physiological incompatibility) and the self-fertility of hybrids between the so-called self-sterile species *Nicotiana Forgetiana* and *N. alata* with the self-fertile species *N. Langsdorffii*. The F_1 are reported to be all self-fertile. Of the F_2, of one cross 144 were self-fertile and 38 self-sterile; from the other cross 200 were self-fertile and 38 self-sterile. The F_3 grown from self-sterile plants of the F_2 are reported all self-sterile. The genetic difference between self-sterile and self-fertile plants in these species is ascribed to the presence and absence of a single determiner for self-fertility. The discrepancies in ratios are considered to be due to "pseudo self-fertility." Variations in the development of "pseudo self-fertility" are reported and these are assumed to be due to another factor or factors which dilute the action of sterility due to the absence of the factor for fertility.—*A. B. Stout.*

2121. East, E. M. **Studies on self-sterility. IV. Selective fertilization.** Genetics 4: 346–355. July, 1919.—Test for selective fertilization in hybrids between the two decidedly self-sterile species *Nicotiana Forgetiana* and *N. alata*, made by comparing variability in the rate of pollen-tube growth of compatible crosses among an F_2 with that of sib matings of the F_2. Data presented for five sections of pistils of each of the two sorts show no significant differences in the two cases.—*A. B. Stout.*

2122. East, E. M. **Studies on self-sterility. V. A family of self-sterile plants wholly cross-sterile inter se.** Genetics 4: 356–363. July, 1919.—Results of a further study of cross-incompatibilities in a family derived by crossing a plant of *Nicotiana alata* (♀) with an F_1 plant (♂) of *N. Forgetiana* × *N. alata*. Of a considerable number of crosses only 13 combinations produced capsules and seeds. The successful cases are ascribed to pseudo cross-fertility and the family is considered as fully self-sterile and cross-sterile. Due to origin of family and the behavior of a sister family the condition is difficult to explain on assumption of a homozygosity for factors of sterility.—*A. B. Stout.*

2123. Ehomann, R. **Endomixis and size variations in pure lines of Paramoecium aurelia.** Proc. Soc. Exp. Biol. Med. 16: 60–65. 1919.—Author refers to work of Jennings on selection in *Paramecium* and *Difflugia*, and discusses the relation of endomixis to the formation of heritably diverse lines in *Paramecium* during asexual reproduction. She decides that endomixis "acts as a *stabilizer* and effaces the fluctuations around the mean, that Jennings had seen in his cultures." The conclusion is reached that endomixis also gives rise to new combinations that can be selected and is thus an "*originator* of new lines." Directed selection can thus isolate heritably diverse lines in an asexually propagated organism.—*R. W. Hegner.*

2124. FISCHER, ED. [Rev. of: KLEBAHN, H. Impfversuche mit Pfropfbastarden. (Infection experiments with graft hybrids.) Flora 11–12: 418–430. 1918.] Zeitschr. Bot. 10: 765–766. 1918.

2125. FREEMAN, G. F. **A mechanical explanation of progressive changes in the proportion of hard and soft kernels in wheat.** Jour. Amer. Soc. Agron. 10: 23–28. Jan., 1918.—The tendency of high gluten wheats to become low gluten wheats, that is, the tendency of a corneous endosperm to become mealy, is attributed to progressive selection. A positive correlation was found between hardness or corneousness in Durum wheat and yield. A negative correlation was found between hardness or corneousness and yield with all other varieties tested at Yuma. In other words, under the hot southern climates hard Durum wheats are the high yielders. Consequently, the hard strains under climatic selection tend to increase. On the other hand, in other strains, the bread and Poulards, the hard strains, yield much less than the soft strains. This difference in a period of years results in a considerable climatic selection, sufficient in a ten-year period to convert a hard Turkey into a soft Turkey by the gradual increase brought about by the differences in yield by soft and hard strains within the type. The possibility of overcoming this tendency is suggested by means of isolating pure strains by individual plant selection and later propagation if there is apparently no change within the strain itself. The change is brought about by the more rapid propagation of one group of strains (soft) as compared with a less productive group of strains (hard).—*Alvin Keser.*

2126. GERTZ, O. **Panachering hos Mercurialis perennis L. En morfologisk, anatomisk och mikrokemisk studie. (Mit Zusammenfassung und Figurenerklärung in deutscher Sprache.) [Variegation in Mercurialis perennis L. A morphological, anatomical and microchemical study. With summary and explanation of figures in German.)]** Bot. Notiser 1919: 153–161. *23 fig.* 1919.—The author describes a form with white-tinged leaves from Torup in Skåne (Sweden). The epidermal cells of the white parts of the leaves lack the undulation of the cellwalls and are always smaller than those of the green parts. Several anomalies of the stomata were observed. The green parts of the leaves were 2.1–1.5 times as thick as the white ones and have larger intercellular spaces. The blue color of the leaves that is often to be observed in dried specimens of *Mercurialis* is due to an oxidation process. Author promises further investigation, also from genetical point of view. [See Bot. Absts. 4, Entry 1557.]—*K. V. Ossian Dahlgren.*

2127. GONZÁLEZ RIOS, P. **La producción de nuevas variedades de cañas. [The production of new varieties of sugar cane.]** Rev. Agric. Puerto Rico 2: 29–38. *8 fig.* 1918.—Chief aim in producing new varieties is to combine characteristics and indispensable qualities of good cane considered in two aspects.—*A.* For cultivation: 1. Germinating power. 2. Resistance against excessive rains or drouth. 3. Growth habit, erect or sprawling. 4. Resistance against fungous or insect diseases. 5. Length of growing period. 6. Tonnage. 7. Power of rattooning.—*B.* For the factory: 1. Characteristics of the canes. 2. Quality and quantity of bagasse, whether brittle or flexible. 3. Juicy or dry. 4. Richness of juice. 5. Purity of juice.—Problem is to produce varieties by crossing which are adapted to various conditions obtaining in different localities. Botanical characters of inflorescence described. Flowers usually perfect but sometimes panicles contain only male or female flowers. Hybridization is done in various ways. 1. Planting varieties alternately, a row or one kind and a row of the other, or alternating the stools. Wind will transfer pollen and effect natural crossing. 2. Enclosing flower-stalks of both parents, while *in situ*, together in small cloth bag. 3. A bagged flower-stalk may be severed and placed in contact with flowers of another growing one. This method has the disadvantage that viability of pollen quickly deteriorates due to humidity or dryness. All these methods produce seedlings and the majority are hybrids. 19 of 30 crosses were successful, giving 1589 seedlings. Seeds are described as to size, shape and morphology. Sowing, transplanting and general culture of seedlings are detailed. Selections are made before maturity, based on number and size of canes, regularity of diameter, high per cent of sucrose, scarcity of fiber, resistance to fungous and insect diseases, etc.—*E. Eugene Barker.*

2128. Gourlay, W. Balfour, and G. M. Veyers. **Vaccinium intermedium Ruthe.** Jour. Botany 57: 259–260. 1919.—This natural hybrid between *V. myrtillus* and *V. vitis-idaea* was discovered in Britain by Robert Garner in Maer Woods, Staffordshire, and exhibited in 1872, when it was thought to be a luxuriant state of *V. vitis-idaea* rather than a hybrid. It was described by N. E. Brown in Jour. Linn. Soc. 24: 125, 1887, as *V. intermedium* Ruthe, from specimens collected by T. G. Bonney on Cannoch Chase. The plant is locally very abundant in the Cannoch Chase area. Slight variations in different localities indicate different acts of hybridization for each locality. Though the parent species must occur together in many localities in England, only one other place has been recorded for the hybrid. The writer asks if any circumstance at Cannoch Chase can be specially favorable for the production and spread of the hybrid, and finds the answer in the constantly disturbed condition of the soil over this area due to its having long been a military training ground. In unmolested areas the parent species grow intermingled, but no hybrids are produced. The flowering periods of the two parents are different, but overlap slightly. Some characters of the hybrid are given. It is said to fruit sparingly. The fertility of the seed is now being tested. —*K. M. Wiegand.*

2129. Gowen, John Whittemore. **A biometrical study of crossing over. On the mechanism of crossing over in the third chromosome of Drosophila melanogaster.** Genetics 4: 205–250. *2 diagram.* May, 1919.—Crossing over is a very variable phenomenon, the coefficient of variation ranging from 18 to 59 for single crossing over and from 67 to 110 for double crossing over. This is a greater variability than has been observed in other physiological or morphological characters. In the third chromosome, crossing over is not affected by external conditions (food, temperature, season, or bottle output); but it is affected by the genes present. Selection for high and for low crossing over was unsuccessful, indicating that there were no differences in modifying factors in the selection experiment. There is a positive correlation between variations in crossing over in different regions of the third chromosome. When allowance for this correlation is made, double crossing over is more likely to occur when the two breaking points are 25 to 35 units apart than when the intermediate distance is greater or less.—*Alexander Weinstein.*

2130. Green, E. Ernest. **As regards mutation in Coccidae.** Trans. Entomol. Soc. London 1918: 149–154. 1918.—The author holds that the resemblance of the scale insect, *Lecanium* (*Coccus*) *viride* to an allied species, *Pulvinaria psidii*, is superficial. He points out a number of differences in various organs and concludes adversely to the hypothesis of K. Kunhi Kannan that one has arisen from the other by mutation. [See Bot. Absts. 3, Entry 2149.]—*Sewall Wright.*

2131. Hanley, Philip. **Egg-weight as a criterion of numerical production in the domestic fowl.** Amer. Nat. 53: 377–393. *1 fig.* Sept.–Oct., 1919.—In a small flock of White Plymouth Rocks mean egg weight and mean flock production paralleled each other in the direction of their fluctuations. That portion of flock showing greatest increase in egg weight, had also the greatest mean annual production, while that showing the least had lowest mean annual production. Possibility of use of increase in egg weight as an index of annual production is suggested.—*H. D. Goodale.*

2132. Harland, S. C. **Notes on inheritance in the cowpea.** Agric. News [Barbados] 18: 68. 1919.—Brief summary of paper to be published in Journal of Genetics. Announces discovery of another color factor *P* involved in anthocyanin coloration of calyx, peduncle and tip of young pod. This gene, two previously discovered genes, *B* and *E*, together with their respective recessives, *p*, *b*, and *e*, behave as a series of multiple allelomorphs. [See also Bot. Absts. 3, Entry 1003.]—*R. J. Garber.*

2133. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. 6: 273–300. July, 1919.—No new theory is presented but the writer sees a movement away from the older idea of the cell as an assemblage of physical units of various sorts to the conception of the proto-

plasm as a unit, its structure identical with the structure of the cell. New contributions to the subject, from cytology, from experimental genetics and from the chemistry of colloids, are discussed with the conclusion that "the old attempts to solve the problem of protoplasmic behavior by the assumption that it is composed of physiological units, biophores, determiners, plasomes, pangens, etc., and the newer conception that its essential elements are unit factors, are being merged in the conception that the structure of protoplasm is the structure of the cell as an organized system and itself the unit in all the complex interactions by which the egg develops into the specialized and differentiated many-celled organisms." [See Bot. Abstr. 3, Entry 1934.]—*Margaret C. Ferguson.*

2134. HARRIS, J. A., AND F. G. BENEDICT. A biometric study of human basal metabolism. Proc. Nation. Acad. Sci. [U. S. A.] 4: 370–373. 1918.—Determinations were made on 333 normal human individuals, men, women, and infants, of the heat production in the postabsorptive state and in complete muscular repose. The relationship between heat production and pulse rate, stature, and body weight was studied; correlation was found to exist between heat production and each of the other measurements, but to be insignificant between pulse rate and stature or body weight. Equations are given showing the decrease in heat production with age. The metabolism of women was found to be lower than that of men even when corrected for age, weight, and stature; the difference between the sexes was not evident in infancy but was well marked throughout adult life. It was found that contrary to the belief that heat production is "proportional to body surface but not to body weight," it was found to be highly and about equally correlated with body weight and body surface. Regression equations involving stature, weight, and age are given for the prediction of the daily heat production.—*Slyvio L. Parker.*

2135. HARRISON, J. B. Seedling sugar canes. Agric. News, [Barbados] 17: 289–290. 1918. Also in Internat. Sugar Jour. 20: 558–559. 1918.—Various problems arising out of the production of sugar cane seedlings are discussed. It is easy to raise new varieties of high promise as plant canes, but difficult to produce types which will do well under a long ratooning system. Seedling canes show a tendency towards senile degeneration. The best seedlings have been raised from parents possessing both vegetative vigor and high saccharine content. In the West Indies the raising of new varieties by cross fertilisation does not seem very promising, owing to the extremely heterozygous nature of West Indian varieties. In countries where relatively homozygous kinds are available, the application of Mendelian methods in raising seedlings may be of value.—*S. C. Harland.*

2136. HARTOG, MARCUS. Parthénogénèse artificielle et germination. [Artificial parthenogenesis and germination.] Scientia 26: 17–27. 1919.—Phenomenon to be explained is not development of egg, but its repose until stimulated. Inactivity is due (as in seeds prior to germination) to inability to use food reserves. When fusion with sperm starts development, initiation is due (1) to introduction of enzyme by sperm, (2) to production of enzyme by sperm after it enters, or (3) to production of enzyme by egg on stimulation by sperm. Enzyme for digestion of reserves in many cases can be produced without entrance of sperm. Development without participation of sperm should not be called "fecundation" or "fertilization," but "induced parthenogenesis," and the means of inducing it "activation." Studies in induced parthenogenesis have contributed no new facts to knowledge of nature of life.—*A. Franklin Shull.*

2137. HAVILAND, MAUD D., AND FRANCES PITT. The selection of Helix nemoralis by the song-thrush (Turdus musicus). Ann. Mag. Nat. Hist. 3: 525–531. June, 1919.—Authors criticize the conclusion of TRUEMAN (Ann. Mag. Nat. Hist., Oct., 1916) that *T. musicus* selects light-banded shells of *H. memoralis*, on the grounds that (a) *H. aspersa* as well as *H. nemoralis* is eaten, (b) there may be differences in the snail population in localities from which the shells found broken at the "anvils" (at which the birds habitually break their shells) and those from which the control collections were made, and (c) that there is no conclusive evidence of selection when snails of different pattern are exposed in the open or offered to the bird in confinement.—*J. Arthur Harris.*

2138. Hayes, H. K., and E. C. Stakman. **Rust resistance in timothy.** Jour. Amer. Soc. Agron. 11: 67–70. 1919.—At Minnesota Exp. Sta. in 1917 authors collected data from one hundred and twenty-five plants on rust resistance of eight Minnesota selected strains and eleven Cornell University improved strains of timothy (*Phleum pratense*). In a rust epidemic induced by spraying the second growth with spores of *Puccinia graminis* Cornell strains showed a high percentage of resistant plants while Minnesota strains were very susceptible. Investigation was discontinued after 1917. Authors conclude that a rust resistant timothy may be easily produced, and think that breeding for disease resistance is often a local problem. They believe that closer coöperation between investigators attacking the same problem would be of national significance.—*J. Ben Hill.*

2139. Hegner, R. W. **Heredity, variation, and the appearance of diversities during the vegetative reproduction of Arcella dentata.** Genetics 4: 95–150. *27 fig.* Mar., 1919.—*Arcella dentata* has many obvious advantages for genetic study, for example, spine number and shell diameter are not modified by growth and environmental factors after division is completed. It was found that the hereditary constitution of different families obtained by vegetative reproduction from different "wild" specimens differs with respect to spine number, probably a vast number of such heritably diverse families occurring in "wild" populations. By selection in 22 generations during 64 days two lines were obtained from a single specimen reproducing vegetatively, showing an increasing difference between their mean spine numbers as selection progressed. This divergence persisted through 35 days (18 generations) of non-selection and is regarded as permanent. Further, halves of the low line were subjected to 23 days (15 generations) selection, followed by 11 days non-selection, with similar result. These divergent subfamilies correspond in heritable characteristics to small families derived from many "wild" individuals. Parallel results were obtained for mean shell diameter of above-mentioned high and low lines and high and low branches of low line. There is significant correlation between spine number and shell diameter. In one instance a sudden large variation ("mutation") in spine number and shell diameter appeared in low line. It was markedly smaller and had fewer spines than other specimens of low line and "bred true." From this branch 3 distinct branches having larger specimens with more spines than any other branch of the selection family appeared. Empty shells were often produced by apparently normal specimens but had no influence upon heritable diversities studied.—A large family of *Arcella dentata*, derived from a single specimen by vegetative reproduction, was split by selection into heritably diverse branches as regards diameter and spine number. These resemble hereditarily diverse families obtained by vegetative reproduction from "wild" specimens. The formation of such hereditarily diverse branches appears to be a true case of evolution that has been observed in the laboratory and that occurs in a similar way in nature. —*A. R. Middleton.*

2140. Henry, Augustine, and Margaret G. Flood. **The history of the Dunkeld hybrid larch, Larix eurolepis, A. Henry, with notes on other hybrid conifers.** Proc. Roy. Irish Acad. 35: 55–66. *Pl. 11.* 1919.—A full description of the anatomical characters of the hybrid and the two parent species, *Larix leptolepis* and *L. europaea*, is given. The remarkable difference in the epidermal cells of the leaves of the European and Japanese larches—the surface of the former smooth, of the latter roughened with papillae—is connected with the fact that the Japanese tree bears considerably more shade than the European species. The papillose epidermis allows much light to penetrate the epidermis, and be available for photosynthesis. In the non-papillose epidermis most of the light is reflected, and is lost to the leaf as far as photosynthesis is concerned. In the hybrid only the cells on the central part of each surface of the leaf bear papillae; the rest of the epidermal cells are smooth. *L. eurolepis* grows with astonishing vigor, much surpassing either of the parents. A hybrid hemlock spruce, *Tsuga Jeffreyi* A. Henry, native of Mount Baker in British Columbia, and of the mountains behind Cowichan Lake, Vancouver Island, is also described.—*Aug. Henry.*

2141. HOOPER, C. H. **The pollination of fruit in relation to commercial fruit growing.** British Bee Jour. 46 (1463): 13, 14. *Ibid.* 46 (1465): 28, 29. *Ibid.* 46 (1467): 45. *Ibid.* 46 (1470): 73. *Ibid.* 46 (1471): 79, 80. *Ibid.* 46 (1473): 97, 98. 1918.—This is mainly a summary of English work, including the experiments of the author. Most clones of apple produce more fruit if pollinated from another clone. Only 24 among several hundred are regarded as more or less self-fertile. The majority of pear clones are self-fertile. Six in England and 6 in America are noted as being slightly self-fertile. Some of the selfed fruits were seedless and cucumber-shaped. Plum clones are about equally divided between the self-sterile and the partially or wholly self-fertile. Only two are named which set fruit nearly as well when selfed as when cross-pollinated. The damsons are more or less self-fertile. Most of the cherry clones are self-fertile. Morello and Late Duke are self-fertile. Cherry clones are more inter-sterile than other fruits. Clones of gooseberry; white, red, and black currants; loganberry; and perfect-flowered strawberry; do not show self-sterility.—*John Belling.*

2142. JOHNSON, JAMES. **The inheritance of branching habit in tobacco.** Genetics 4: 307-340. *8 pl., 2 fig.* July, 1919.—Inheritance of suckering habit has been studied in cross between Little Dutch, which produces few suckers, and Cuban, which produces many large suckers. Parents and several generations of cross were grown same year. Reciprocal crosses were alike in F_1, being intermediate in sucker number but slightly higher in weight of suckers. Range of the F_2 is as great as combined range of parents. Segregation is definitely shown in F_2 and later generations. Strains were isolated which were suckerless like Little Dutch parent and others which approach suckering habit of Cuban parent. Certain of these were no more variable than the parental types as shown by standard deviation (5). Segregation occurred for other characters, such as height of plant, number of nodes and leaves, size and shape of leaves. Two abnormalities were obtained. No correlation appears to exist between number, size and shape of leaves and suckering habit. Results are interpreted on the multiple factor hypothesis which has been formerly used for interpreting inheritance of quantitative characters.—*H. K. Hayes.*

2143. JONES, D. F. **Selection of pseudo-starchy endosperm in maize.** Genetics 4: 364-393. *8 pl., 1 diagram.* July, 1919.—Analysis of an apparently intermediate endosperm character in maize is presented. This intermediate condition between true starchy and sugary endosperm is termed pseudo-starchy, resembling the typical starchy maize in gross chemical analysis but approaching the sweet type in nature of the starch grains and texture of endosperm.—Selection experiments upon this endosperm character for 10 years were successful in producing as end results a typical starchy-appearing strain and a true sweet strain. Selection was not markedly effective in the first generation but during the following four generations the divergence between the two end types was completed.—Reciprocal crosses of this selected starchy (pseudo-starchy) strain and true starchy plants gave a starchy F_1 and a definite F_2 segregation of 3 starchy to 1 sweet. The appearance of the pseudo-starchy endosperm in F_1 as sweet endosperm indicates a genetic difference between pseudo- and true starchiness.—Reciprocal crosses between the end products of the selection experiments showed no immediate effect on the endosperm. This fact, coupled with the intermediate and variable nature of the F_1 ears as regards endosperm characters, and the occurrence in subsequent generations of a distinct 3:1 and 1:1 segregation of endosperm, suggest the presence of a plant factor governing endosperm expression and two endosperm factor-pairs.—The results of selection are explained as being due to the sorting-out and rearrangement of such factors and not to the progressive change of an intermediate and incompletely segregating genetic factor.—*E. W. Lindstrom.*

2144. JONES, D. F., AND C. A. GALLASTEGUI. **Some factor relations in maize with reference to linkage.** Amer. Nat. 53: 239-246. May-June, 1919.—Authors present data in confirmation of results of Collins that ordinary pod (tunicate) corn is heterozygous always throwing normal, heterozygous tunicate, and nearly sterile homozygous tunicate. They report discovery of linkage between factors for tunicate ear and sugary endosperm with 8.3 per cent

crossing-over, and independent inheritance of tunicate and yellow endosperm. Review published results of other investigators and suggest three independent groups of linked factors in maize.—*R. A. Emerson.*

2145. Kajanus, Birger. **Genetische Papaver-Notizen. [Genetical notes on Papaver.]** Bot. Notiser 1919: 99–102. 1919.—Under the term "Rhoeas-group" the author includes with *Papaver somniferum* a number of commercial forms and the similar species *P. umbrosum*, *P. Hookeri*, and *P. laevigatum*. The species *P. paeonium* and *P. glaucum*, being distinct, are not included in this group. Members of the Rhoeas-group show considerable variation in a number of characters: flower and leaf color, color of stem hairs, and color of latex. Many of the types included in this group were almost or completely sterile when self-fertilized. One plant from the group produced selfed seed, the plants from which resembled their parent but they produced so few seeds that no conclusions were drawn regarding fertilisation ratio.—Four types of artificial crosses are recorded: 1. Those between plants within the Rhoeas-group. 2. *P. rhoeas* ♀ × *P. glaucum* ♂. 3. *P. somniferum* ♀ × *P. rhoeas* ♂. 4. *P. somniferum* ♀ × *glaucum* ♂. Only crosses of the first two kinds produced positive results. Plants employed showed the following characters: white vs. yellow latex, light red vs. scarlet petals, white eye-spot (Herzflerken) vs. black eyespot. The F_1 plants showed segregation in latex color (24 yellow, 32 white) and in eye-spot color (black 24, white 31). A system of dominant and recessive genes is given in explanation of the alternative behavior of these characters. None of these F_1 plants produced fertile seed when self-fertilized. The cross *rhoeas* × *glaucum* produced 11 F_1 plants which showed typical F_1 hybrid vigor. They, however, showed some characters of both parents. Ten bagged flowers gave no selfed seed. Open-pollinated seed produced plants resembling *rhoeas*.—*J. L. Collins.*

2146. Kajanus, B. **Über eine konstant gelbbunte Pisum-Rasse. [On a constantly yellow-variegated variety of Pisum.]** Bot. Notiser 1918: 83–84. 1918.—Author found in an F_2 family of *Pisum arvense punctatum* × *P. arvense maculatum* besides normal green plants also several yellow-variegated ones. The numerical relation of the two kinds of plants was probably 3:1. An exact count was not undertaken however. Three yellow-variegated plants gave (1) 55 yellow-variegated: 2 green; (2) 6:2; (3) 32:0. The occurrence of green plants is probably due to hybridization with normal individuals. One specimen of (3) produced only yellow-variegated plants and their offspring had the same coloration. The yellow-variegated variety is therefore constant.—*K. V. Ossian Dahlgren.*

2147. Kajanus, B. **Genetische Studien über die Blüten von Papaver somniferum L. [Genetical studies on the flowers of Papaver somniferum L.** Arkiv Bot. K. Svensk. Vetenskapsakad. 15^{11}: 1–87. *3 pl.* 1919.—Author has worked with about 20,000 plants. Doubleness depends on absence of two homomeric genes. For the splitting of the sepals it seems that at least three genes were operating. In the presence of these factors, entire petals can be obtained through influence of an inhibiting factor. There are specific genes for color and others which regulate the distribution of color. The color genes are divided into two groups, one for violet, one for red. In each group there is one fundamental gene that produces the weakest tint and a series of intensifying genes. Presence of the gene characteristic of the violet groups, alone, makes the petals violet above as well as below. The presence of the gene of the red group makes them red above and white below. If both genes are combined, the colors become red on the upper and violet on the under side, whereas in the absence of both genes the petals are white. The genes of distribution play a great rôle in the habit of the flowers and affect also the shade of color.—One gene is associated with green-striping, another with white-striping of the petals. Also in relation to other anomalies special genes are traced.—*K. V. Ossian Dahlgren.*

2148. Kajanus, B., and S. O. Berg. **Pisum-Kreuzungen. [Pisum-crosses.]** Arkiv Bot. K. Svensk. Vetenskapsakad. 15^{13}: 1–18. 1919.—A new inhibiting gene *O* is found, which suppresses dark blood-red or red brown color of the seed-coats. The effects of five other genes earlier treated by Lock (Ann. Roy. Bot. Gard. Peradenya 4. 1908) have also been studied.—*K. V. Ossian Dahlgren.*

2149. KANNAN, K. KUNHI. **Mutation in Coccidae.** Trans. Entomol. Soc. London 1918: 130–148. *4 pl.* 1918.—Typical specimens of the scale insect, *Coccus viridis*, originally described from Ceylon, appeared in Mysore in Southern India in 1912. These had normal seven-jointed antennae. All specimens collected in later years were found to have a reduced number of joints, usually three. The author considers that a mutation had taken place. The variations of Coccus *viridis* in different parts of the world, and of an allied species, *Pulvinaria psidii*, are discussed. From a consideration of these variations, the author considers it probable that *C. viridis* has arisen from *P. psidii*, directly or indirectly, by mutation. [See Bot. Abstr. 3, Entry 2130.]—*Sewall Wright.*

2150. KARPER, R. E., AND A. B. CONNER. **Natural cross-pollination in milo.** Jour. Amer. Soc. Agron. 2: 257–259. 1919.—41 heads of white milo [*Sorghum*] which had been mechanically introduced into a plat of yellow milo were selected and planted the following year. Of 13,430 progeny, 788 were hybrid plants with yellow seed heads, 42 were hybrid plants not classed as yellow, while the percentage of cross fertilization was 0.18.—*F. M. Scherlz.*

2151. KARSTEN, G. [Rev. of: ERNST, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre.** (*Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.*) *8 vo., xv + 655 p., 2 pl., 172 fig.* Gustav Fischer: Jena, 1918.] Zeitschr. Bot. 11: 53–61. 1919.—See also Bot. Abstr. 3, Entry 2113.

2152. KEMPTON, J. H. **Inheritance of spotted aleurone color in hybrids of Chinese maize.** Genetics 4: 261–274. *3 fig., 3 diagrams.* May, 1919.—Spotted aleurone-color pattern is due to factor *S* but observed only when female parent of cross is heterozygous for aleurone-color factor *R* or is r r. Selfed ears of composition *R r S* a had 29.4 per cent of colored seeds spotted. Observed percentage of spotting is assumed to be due to linkage of *R* and *S* with 12.5 per cent crossing-over.—*R. A. Emerson.*

2153. KEMPTON, J. H. **Inheritance of waxy endosperm in maize.** U. S. Dept. Agric. Bull. 754. *99 p., 14 fig.* June 26, 1919.—Counts of 198 ears with over 100,000 seeds of crosses of waxy with corneous endosperm showed a statistically significant deficiency of waxy segregates from the expected 25 per cent. Reciprocal crosses of heterozygous plants with homozygous waxy indicated, in some cases, a deficiency of effective male gametes bearing waxy. Author suggests unequal segregation or differential vigor or death rate. With respect to aleurone color, author reports a slight but statistically significant excess of white seeds over expected 25 per cent from selfed ears and a similar deficiency of white from ears back-crossed to recessive. Waxy endosperm was found not linked with aleurone-color factor *R* but linked with *C*, the percentage of crossing-over usually approximating 25 but in some cases approaching 20.—*R. A. Emerson.*

2154. KIHARA, HITOSHI. **Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftverhältnisse unter Avena-arten.** [*Cytological studies in the cereals. II. Chromosome counts in reference to the relationship of oat species.*] Bot. Mag. Tokyo 33: 94–97. *2 fig.* 1919.—See Bot. Abstr. 3, Entry 1939.

2155. KLEBAHN [H.] [Rev. of: BARTLETT, HARLEY HARRIS. **Mass mutation in Oenothera pratincola.** Bot. Gaz. 60: 425–456. 1915.] Zeitschr. indukt. Abstamm. Vererb. 21: 134–136. July, 1919.

2156. KOTTUR, G. L. **Note on protecting the cotton flowers from natural crossing.** Poona Agric. Coll. Mag. 9: 131–132. *3 fig.* 1918.—Points out necessity of preventing natural cross-pollination of cotton flowers from which pure seed is desired and describes method of wiring fully developed but closed flower bud so as to prevent opening of corolla. [Similar method described by Rowland M. Meade in U. S. Dept. Agric. Bur. Plant Ind. Circ. 121: 29–30. 1913.]—*T. H. Kearney.*

2157. Lehmann, E. [Rev. of: (1) Bateson, W., and C. Pellew. **On the genetics of rogues among culinary peas (Pisum sativum).** Jour. Genetics 5: 13–36. 1915. (2) Biffen. **The suppression of characters on crossing.** Jour. Genetics 5: 225–228. 1915. (3) Backhouse, W. O. **The inheritance of glume length in Triticum polonicum. A case of zygotic inhibition.** Jour. Genetics 7: 125–133. 1918. [See Bot. Absts. 1, Entry 211.] (4) Capron, A. St. Clair. **The inheritance of tight and loose palese in Avena nuda crosses.** Jour. Genetics 7: 229. 1918. [See Bot. Absts. 1, Entry 866.] (5) Idem. **An account of an experiment to determine the heredity of early and late ripening in an oat cross.** Jour. Genetics 7: 247. 1918. [See Bot. Absts. 1, Entry 867.] (6) Idem. **On a case of permanent variation in the glume lengths of extracted parental types and the inheritance of purple colour in the cross Triticum polonicum and T. Eloboni.** Jour. Genetics 7: 259. 1918. [See Bot. Absts. 1, Entry 868.] Zeitschr. Bot. 10: 758–763. 1918.

2158. Lehmann, E. [Rev. of: Heribert-Nilsson, Nils. **Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung Salix. (Experimental studies on variability, segregation, speciation and evolution in the genus Salix).** Lunds Univ. Arsskrift 14: 1–145. *65 fig.* 1918.] Zeitschr. Bot. 11: 205–212. 1919.

2159. Lehmann, Ernst. **Über die Selbststerilität von Veronica syriaca.** [On the self-sterility of Veronica syriaca.] Zeitschr. indukt. Abstamm. Vererb. 21: 1–47. *1 fig.* May, 1919.—In a year of investigation with *Veronica syriaca*, not a single self-fertile plant was found. Subsequently, in a cross between two self-sterile individuals, 114 F_1 plants were studied. All proved to be self-sterile. These plants fell intn four groups of about equal size which were intra-class sterile and inter-class fertile. Samples from each class were planted in isolated plats, but produced no seed. The author promises a Mendelian interpretation.—*E. M. East.*

2160. Lehmann, E. [Rev. of: White, O. E. **Inheritance studies in Pisum. I. Inheritance of cotyledon color.** Amer. Nat. 50: 530. 1916.] Zeitschr. Bot. 10: 763–764. 1918.

2161. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. 11: 143–162. *2 fig.* 1919.—Authors, working with Minnesota- and Virginia-grown varieties of wheat, observe that in 2977 cases the time of blooming is approximately evenly divided between night and day. In day time, morning-blooming is slightly more frequent than afternoon-blooming. Although undetermined, it is suspected that night-blooming actually occurs in early morning hours. Two active periods of day-blooming with peaks of curves at 8 a.m. and 4 p.m., suggest temperature relations as possible cause of such distribution. The observations correct the impression that wheat blooms only in early morning. The duration of period of blooming covers from 2 to 7 days. Minnesota-grown wheat produced kernels in 40.97 per cent of 1240 flowers emasculated but not covered. Virginia-grown wheat produced kernels in 83.3 per cent of 1324 flowers so treated. Resulting from errors of manipulation, 8 kernels, 0.78 per cent, were produced from 1030 flowers emasculated and covered. For accuracy in cross-pollinations in wheat, protection of the flowers is indicated. [See Bot. Absts. 3, Entry 1968.]—*J. Ben Hill.*

2162. Lenz, Fritz. **Alternative Modifikationen bei Schmetterlingen.** [Alternative modifications in butterflies.] Zeitschr. indukt. Abstamm. Vererb. 19: 304–309. Aug., 1918.—Referring to earlier work in which it was shown that pupae of butterfly *Papilio machaon* L. were either green or gray (with some intermediate forms), and that while many green pupae hung from stalks, most gray ones were attached to surfaces, author now reports that color is largely due to intensity of light prevailing just before pupation. Full light results in green, darkness in gray. Choice of place of pupation is also related in some way to light. Color determination is regarded as adaptation to conditions in nature.—*A. Franklin Shull.*

2163. LOVE, H. H., AND W. T. CRAIG. **Methods used and results obtained in cereal investigations at the Cornell Station.** Jour. Amer. Soc. Agron. 10: 145–157. *1 pl., 1 fig.* April, 1918.—The row method of testing cereal crops in agronomic experiments as carried out at Cornell University has been adopted because replicated row plats enable greatly increased numbers to be handled on the same land with as great accuracy as larger plats and at much less cost. The probable error is very greatly reduced as the number of replications increases. It has been found that the chance of finding a superior strain in selection work is dependent upon the number handled. In a large number of cases of different selections the chance of finding a superior strain is a function of the numbers involved. Two general methods of selection are used. Head selections are made in the field, taking care to select from average growing conditions. These head selections are planted in head rows. The head rows average 2½ feet in length for wheat and 5 feet in length for oats. The length of row is dependent upon the number of kernels in the head selected. The second method of selection consists in planting selected strain with spacings of one foot each way. The superior plants from these one foot rectangular plantings are taken over for plant row tests the following year. Head row tests become plant row tests the second year. A large amount of elimination takes place in the head rows. In the plant row tests at least three-fourths of the strains disappear the first year, the superior strains being mostly in the one-fourth retained. The plant row tests are usually continued for three years, eliminating inferior strains each year. Special methods of planting have been devised. The harvested bundles at harvest are stored in a curing shed in the order of their field numbers. The length of the rod rows or plant rows varies in such a way that a simple factor can be used to convert the grams per row into bushels per acre. The oat rows are 15 feet. The grams are multiplied by 0.2 to obtain bushels per acre. For wheat, the length is 16 feet and for barley 20 feet, the conversion factor in each case being 0.1. For improvement work very few notes are taken. The note work is reduced to those strains which are actually shown to be superior and are thus kept. Rod rows do not give the same yields even when replicated, as are obtained by plants, but the yields are of the same order.—In hybrid work with grains, the strains to be crossed are planted in pots and grown in the greenhouse. This enables hybridization work to be done at a season when outside work is not heavily pressing, reducing the danger of contamination and injury by weather and enables the strains to be crossed to be brought closely together, saving time in carrying pollen from the pollen parent to the pistil parent. Later generations of hybrids are handled much as strain selection, except that segregations are made largely in the laboratory. One variation from standard methods of operation in pollinating is that the tips of the glumes may be clipped to facilitate the operation of pollination. When handled in the greenhouse, data show that there is practically no difference whether the glumes are clipped or unclipped. Brief mention is given of results obtained in crosses, but the detailed results are published elsewhere.—*Alvin Kezer.*

2164. MACKIE, D. B. **Navel Satsumas found in California.** California Citrograph 4: 60. *1 fig.* Jan., 1919.—Writer recently reported in same journal the occurrence of navel fruits of Satsuma mandarin in Japan. A reader of that article reports finding at Oroville, California, navel fruits on certain branches of Satsuma trees. These fruits were seedless, and writer suggests possibility of propagating a seedless navel strain of Satsuma. [Ordinary Satsuma fruits are very largely seedless.] [See Bot. Abstr. 3, Entry 2344.]—*H. B. Frost.*

2165. MARTIN, JOHN NATHAN. **Botany for agricultural students.** *16 × 24 cm., x + 585 p., 488 fig.* John Wiley & Sons, Inc.: New York, 1919.—Chapter 22 (p. 513–534), "Evolution," includes paragraphs on variation, heredity, experimental evolution, continuous variation, discontinuous variation or mutations, mutation in the evening primrose, the mutation theory and Darwinism, causes of variation, somatoplasm and germplasm. Chapter 23 (p. 535–556), "Heredity," is mostly devoted to a statement of MENDEL'S discoveries and their confirmation, but also gives single paragraphs to the physical basis of heredity, active and latent genes, and biometry. Chapter 24 (p. 557–565), "Plant breeding," contains brief sections on selection, mass culture, pedigree culture, selection of mutants, hybridization, crossing and vigor of offspring.—*Geo. H. Shull.*

2166. Matouschek. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid.—Die Enzymtheorie der Erblichkeit.—(The enzyme theory of heredity.)** Versl. K. Akad. Wetensch. Amsterdam. 25: 1231. 1917. (2) Idem. **The enzyme theorie of heredity.** Proc. K. Akad. van Wetensch. Amsterdam. 19: 1275. 1917.] Zeitschr. Pflanzenkrankh. 29: 78–79. 1919.—See also next following Entry, 2167.

2167. Matouschek. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid. (The enzyme theory of heredity.)** Versl. K. Akad. Wetensch. Amsterdam. 25: 1231. 1917. (2) Idem. **The enzyme theorie of heredity.** Proc. Akad. Wetensch. Amsterdam 19: 1275. 1917.] Zentralbl. Physiol. 33: 307–308. Jan. 31, 1919.—See also next preceding Entry, 2166.

2168. McCampbell, C. W. **Kansas State Livestock Registry Board.** Kansas Agric. Exp. Sta. Insp. Circ. 8. *149 p.* 1918.—Contains several reports on the horse breeding industry of the country, and in addition a complete record of the registered stallions in the state of Kansas. Out of 5087 stallions registered, 3269 were pure-bred.—*Heman L. Ibsen.*

2169. Melin, D. **Några tankar om mimiery och skyddande likhet med stöd af dipterologiska studier. [Some thoughts on mimiery and cryptic colors based on dipterological studies.]** Entomol. Tidskr. 1918: 239–294. *2 pl.* 1918.—In the first part the author deals with different problems of mimicry,—starting from the color scheme of Poulton. In the second section he presents his own experiences and speculations. He considers that natural selection does not cause so detailed correspondence of the morphology as the theory of mimiery demands. It is generally considered that birds are chiefly effective in natural selection of insects, supposition being that birds avoid "immune" species and are able to discover the slightest differences in the morphology of insects. Neither the first nor the second supposition agrees with observed facts. Against aggressive mimicry by robber flies (asilids), as the author has demonstrated, is the circumstance that these flies are able to distinguish details of form and color with much greater difficulty than animals of higher classes.—Flies very often hunt flying seed-downs by mistake.—The author considers that "warning colors" do not exist. The *Lophria* species thus attack ladybirds and other poisonous beetles; the Ichneumonides never spare similar larvae of butterflies, etc. The author's views are summarized as follows:—1. Mimicry and mimetic analogies depend upon the manner of living and upon external and internal influences.—2. Instinct acts in some degree as an influencing power.—3. Animals which are similar to immune species with bright colors or which agree in color with their surroundings, often will, by this reason, escape enemies. This advantage is however only secondary and without great importance.—4. Natural selection is therefore not directly produced by living enemies but only by different natural powers. Animals which in form and color react in the best way against the same, become determinative for the species.—*K. V. Osnion Dahlgren.*

2170. Mendiola, N. B. **An inhibitor in rice.** Philippine Agric. 7: 65. 1918.—The author states that, in 1914, Jacobson reported two pink kernels, which he designated as (a) and (b) from a head of a white variety of rice. Upon inbreeding, (a) produced in the first generation 100 per cent white kernels, while in the second, 6 per cent red kernels and presumably (although it is not stated) 94 per cent white were obtained, while (b) gave in the first generation 100 per cent red and in the second, 24 per cent white and 76 per cent red. (b) Behaved as a simple monohybrid with red dominant over white, but (a) did not. Jacobson did not try to explain the behavior of (a). The author offers two explanations: 1st, that (a) was a monohybrid like (b) but that it failed to exhibit Mendelian ratio on account of the effect of environment. 2nd, there was possibly present in the original kernel an inhibitory determiner. That the character red was not absent in the first generation altogether is shown by the fact that it appeared in the second. The partial dominance of red in the second generation may have been due to the presence of an inhibitory determiner which prevented red from manifesting its total potency.—*H. B. Brown.*

2171. MEYER, FRIEDRICH. **Die Plastosomentheorie der Vererbung. Eine Antwort auf verschiedene Einwände.** [**The plastosome theory of inheritance. An answer to various objections.**] Arch. mikrosk. Anat. 92^{II}: 41–136. *18 fig.* 1918.—The hypothesis defended here is that certain extra-nuclear granules are introduced into the plant egg-cell or animal ovum with the sperm of the pollen-tube; or with the middle-piece, or cytoplasm, of the spermatozoon. These granules (mitochondria or plastosomes) sometimes take the form of fine filaments. In the plant, they go to form the chloroplasts, or leukoplasts; or fragment in the formation of vessels, and form the internal ridges. A first-generation hybrid between a red-flowered and a white-flowered plant may be of intermediate color, because both anthocyanin and chromoplasts are products of the plastosomes; and plastosomes from the pollen of one parent have been mingled in the zygote with the plastosomes of the egg-cell of the other parent. The pigment granules of animals are also products of the plastosomes. Embryonic tissues, and certain cells of the adult plant or animal, are capable of division and development into new organs, if and because they contain unmodified plastosomes. Author regards the plastosome hypothesis, not as replacing the current nuclear theory of heredity; but as supplementary to it.—In *Ascaris* he has shown that plastosomes from the sperm-cell spread out in the egg-cytoplasm after fertilization. This has been confirmed. The granules were at first about 0.5 μ across. BOVERI and HOGUE centrifugalized such zygotes; and though the plastosomes collected into a clump, yet normal embryos resulted. In *Filaria*, the granules are larger, and change at later stages of cleavage into filaments. *Phallusia* and *Mytilus* have fewer mitochondria in the sperm, as compared with the egg. In fishes, amphibia, reptiles, and birds, there is an enormous difference in this respect. Author thinks that there is some proof of polyspermy being sufficiently widespread to compensate at least partly for the deficiency of plastosomes in the spermatozoa in these cases.—In *Echinus* the plastosome-bearing middle-piece of the spermatozoon goes into only one of the two first blastomeres. Author considers that this blastomere gives rise to the echinus, while the other blastomere forms that part of the pluteus which is destined to be thrown off. In *Vesperugo* and *Caria* it has been shown that the tail of the spermatozoon at the first cleavage remains in one of the blastomeres. LEVI found, in another bat, the middle-piece of the spermatozoon in one of the two small segmentation cells. Author combines these facts with the opinion of Sobotta, that the mammalian egg has unequal blastomeres, only one of the first four forming the embryo, while the other three serve as trophoblasts.—The paper includes general arguments in favor of the theory; detailed replies to its many critics; a full history of the subject down to 1910; and a large bibliography.—*John Belling.*

2172. MEYER, ADOLF. **The right to marry; what can a democratic civilization do about heredity and child welfare?** Mental Hygiene 3: 48–58. Jan., 1919.—Author makes an effort to separate the relative influences of heredity and environment. He says: "What we speak of as heredity in the sense of influence of the parent on the constitution of the child, is oftenest the sum of three factors: (1) genuine heredity, that which comes with the germ cells and is itself inherited,—a property of the chromosomes; (2) early growth and nutrition; (3) early training and habit-formation." In answer to the self-put question, "Who is entitled to progeny?", he says: "We can do justice to the individual as well as to the race by making some practical conditions for such individuals to marry and have children; that is, if they can feel and give to their own sense and conscience (and I might add under the effects of three weeks' open consideration of marriage) reasonable assurance of giving a family of four children a wholesome, healthy environment and education, then even tainted persons might be allowed to marry, especially into untainted stock. If any unfavorable heredity should crop out, it would be highly probable that healthy and capable brothers and sisters would be able to assure the protection and care of the problematic abnormal individual. This excludes the marriage of imbeciles and of many psychopaths.—"In this present stage of development, eugenics has no right to attempt to enforce a stronger negative policy than this. If it does so, it runs the risk of depriving the race of individuals who would be a benefit to it. I certainly should not like to miss some of the brothers and sisters of certain of my patients from this globe, nor even a good many of the actual patients themselves."—The paper gives sum-

maries of a few family history studies. It insists that physicians must not give eugenical advice without adequate family history data, and urges that parents should not be sensitive in the matter of taking stock of the mental limitations of their children, and finally advises that education, co-operation and the setting forth of principles and the establishment of custom are better than legislation in promoting eugenical ends.—*H. H. Laughlin.*

2173. Miyake, K., and Y. Imai. **Digitalis no Kwasyoku oyobi sonotano Keisitu no Iden ni tuite.** [On the inheritance of flower-color and other characters in Digitalis purpurea.] [Japanese.] Bot. Mag. Tôkyô 33 (Japanese part): 175–186. 1919.—Experiments were performed on natural hybrids. The fact first discovered by Miss Saunders that glabrousness is dominant to hairiness and that the segregation of these allelomorphs takes place in 3:1 ratio was confirmed. Purpleness of stems, peduncles, etc., were found to be dominant to their greenness; their segregation takes place in 3:1 ratio. Self-fertilisation of purple flower has given rise to 23 purple-flowered and 7 white-flowered plants, whence authors think that white is recessive to purple and not dominant, as it should be according to Keeble, Pellew and Jones (New Phytologist 9,1910). Authors consider that two factors *C* and *P* with their absences *c* and *p* are concerned in the production of flower-color, *P* making flowers purple in the presence of *C*.—*S. Ikeno.*

2174. Mohr, Otto L. **Character changes caused by mutation of an entire region of a chromosome in Drosophila.** Genetics 4: 275–282. May, 1919.—The appearance of notch wing (for the eighth time) was due to mutation or "deficiency" of an entire region of the sex chromosome about 4.8 units long and including many genes. Like bar-deficiency, notch allows the allelomorphic genes, even though normally recessive, to show when in heterozygous condition. Like bar-deficiency, it is lethal in males. Unlike bar-deficiency, notch exaggerates the effect of allelomorphic genes. Notch cannot therefore be mere loss or inactivation of genes, since no exaggerating effect is produced in XO males, where one sex chromosome is known to be entirely missing. No crossing over occurs within the "deficient" notch region; and crossing over is disturbed in neighboring regions.—*Alexander Weinstein.*

2175. Mohr, O. L., and A. H. Sturtevant. **A semi-lethal in Drosophila funebris, that causes an excess of males.** Proc. Soc. Exp. Biol. Med. 16: 95–96. 1919.—In *D. melanogaster*, deficiency of females, opposite to effect of sex-linked lethals, is much less frequent and hitherto unexplained. In a race of *D. funebris*, ratios vary from all males to approximate equality. Data indicate excessive sex-limited mutation causing abnormal abdomen, which commonly affects only females, though transmitted by both sexes. Degree of abnormality is dependent on environmental conditions, as yet uncontrollable. Very abnormal females die as pupae, and excess of males results.—*C. R. Plunkett.*

2176. Morgan, T. H., and C. B. Bridges. **The construction of chromosome maps.** Proc. Soc. Exp. Biol. Med. 16: 96–97. 1919.—Accuracy of chromosome map depends upon (1) mutants and wild-type cleanly separable and equally viable; (2) loci properly spaced; (3) correction for double crossing over; (4) uniform conditions, especially of age, temperature, and crossing-over modifiers; (5) any experiment figured only once for each region of chromosome; (6) data adequate and (7) properly weighted; (8) framework of map constructed from most significant loci, others interpolated as accurately as possible.—*C. R. Plunkett.*

2177. Nachtsheim, Hans. **Die Analyse der Erbfaktoren bei Drosophila und deren zytologische Grundlage.** [Analysis of the inheritance-factors in Drosophila and their cytological basis.] Zeitschr. indukt. Abstamm. Vererb. 20: 118–156. *12 fig.* Jan., 1919.—An exhaustive and accurate review of the literature on the genetics and cytology of *Drosophila*, including nearly all papers published up to the end of 1915.—*A. H. Sturtevant.*

2178. Neethling, J. H. **A preliminary note on dwarfs appearing in Gluyas Early (wheat) hybrids.** South African Jour. Sci. 14: 540–547. *6 fig.* 1918.—Certain crosses between Gluyas Early and other common wheats produced a number of dwarf forms in the F_2 and F_3. The

plants of the F_2 generation which produced dwarf forms were somewhat shorter in height and ear length than those which yielded normal forms. The proportion of normal forms to dwarfs approached the 3:1 ratio, showing that dwarfness in this case is recessive. In every case, however, there were one to about three per cent less dwarfs produced than expected. Author ascribes this lowering of expected percentage to failure of germination and use of unskilled labor. As natural crossing occasionally takes place in wheat and dwarf segregates were found to hardly produce any seed or even head out, from an economic viewpoint the writer considers risky the growing of varieties which are liable to produce dwarf forms when naturally crossed.—*S. Boshnakian.*

2179. PORTER, WILLIAM C. **Huntington's chorea; a report of a family history study made in Dutchess and Putnam counties, New York.** New York State Hosp. Quart. 4: 64-74. Nov., 1918.—This paper gives a short history of pedigree investigations into Huntington's chorea. This began with DR. CHARLES N. WATERS, of Franklin, Delaware County, New York in 1842. Continuing, DR. CHARLES R. GORMAN, of Pennsylvania, reported a group of cases in 1848, and DR. IRVING LYONS, of Fairfield County, Connecticut, reported 3 cases in 1863. DR. GEORGE HUNTINGTON, in 1872, reported studies made by himself, his father and grandfather in Easthampton, Long Island, through a period of 72 years. The author then gives a first-hand pedigree study accompanied by Chart A, "The W—— Family." In this family group 56 persons are charted, 19 of whom had Huntington's chorea and 13 of whom were still, at the time of the report, below the age of 35, which is taken as the average age of incidence. Chart B records 49 persons, of whom 15 had chorea and 2 were indicated as below the age of incidence. Chart C records 25 members of the family-tree, of whom 7 had Huntington's chorea and 9 are recorded as below the average age of incidence.—*H. H. Laughlin.*

2180. RASMUSON, HANS. **Zur Genetik der Blütenfarben von Tropaeolum majus.** [On the genetics of the flower colors of Tropaeolum majus.] [German.] Bot. Notiser 1918: 253-259. Nov., 1918.—Dark yellow crossed with light yellow gave dark yellow in F_1 and approximately 3 dark yellow to 1 light yellow in F_2. Light yellow bred true in F_2, dark yellow gave some populations containing only dark yellows and some containing approximately 3 dark yellow to 1 light yellow. Red crossed with yellow gave red in F_1 and approximately 3 red to 1 yellow in F_2. Homozygotes were dark red and heterozygotes light red, and in each class 2 sub-classes existed according as red was borne on dark or light yellow base. In F_3 dark red gave only dark reds, yellow gave only yellows, and light red gave approximately 3 red to 1 yellow. Existence of different genetic types of red is considered self-evident. On account of technical difficulties only small populations were secured throughout.—*R. E. Clausen.*

2181. RASMUSON, HANS. **Über eine Petunia-Kreuzung.** [On a Petunia cross.] [German.] Bot. Notiser 1918: 287-294. 1918.—In 1915 author made several crosses between forms of *Petunia hybrida* (the product of *P. nyctagini flora* Juss. × *P. violacea* Lindl.). One of these has been followed to the F_2 generation. P_1 female had almost white flowers with blue throat and anthers. P_1 male had violet flowers with yellow throat and anthers. F_1 generation produced four different types: I. Violet, blue anthers, blue throat, 15 plants; II. Violet, yellow anthers, yellow throat, 15 plants; III. Dark red-violet, blue anthers, blue throat, 10 plants; IV. Dark red-violet, yellow anthers, yellow throat, 2 plants. These are assumed to belong to two genotypes, the first comprising types I and III, the second, types II and IV, giving a segregation ratio of 25: 17 for blue, as contrasted with yellow, anthers and throat, thus indicating that one P_1 plant was heterozygous for these characters.—Five F_2 families were grown: A-1, A-2, B-1, B-2, C-1. Progeny in each showed 2 classes for flower color, viz., dark violet or red-violet and pale-colored, the ratio in each family and in the summation of families, closely approximating the 3: 1 ratio. Possibility of genotypic differences within each class noted. Among the pale-colored plants of families B-1 and B-2 was found a difference in color of the nerves on the outside of the corolla. They were either dark violet or green (3 were greenish and pale violet below) in the ratio 3: 1. As for anther color, the progeny of F_1 plants with yellow anthers were yellow while the progeny of blue-anthered

F_1 plants segregated into blue and yellow in the ratio 3:1. Considering flower color and anther color simultaneously 4 classes appear: dark flowers, blue anthers; dark flowers, yellow anthers; pale flowers, blue anthers; pale flowers, yellow anthers, in a ratio close to 9:3:3:1. The gene for dark flower color and the gene for blue anther color are not linked. Anther color and throat color are conditioned by the same gene.—*E. B. Babcock.*

2182. RASMUSON, H. **Zur Frage von der Entstehungsweise der roten Zuckerrüben.** [On the origin of red sugar beets.] Bot. Notiser 1919: 169–180. *2 fig.* 1919.—Some red sugar beets were planted in a place where no pollination by other sorts could occur. Four of these plants gave together 456 red, 182 yellow and 201 white ones. These numbers indicate, as also shown by Kajanus, the segregation 9:3:4. Some of the plants produced had appearance of fodder beets. The red plants had a smaller content of sugar than the white ones in the same parcel. Among the offspring of the red plants there was great variation (6–16.8 per cent) in amount of sugar, undoubtedly due to genotypical differences, consequently fodder-beets were segregated as to all qualities analyzed. Probably the original red sugar beets were F_1 plants from the combination, sugar beet × fodder beet.—*K. V. Ossian Dahlgren.*

2183. RENNER, O. [Rev. of: BAUR, E. **Mutationen von Antirrhinum majus. (Mutations of Antirrhinum majus).** Zeitschr. indukt. Abstamm. Vererb. 19: 177–193. *10 fig.* June, 1918. (See Bot. Absts. 2, Entry 1198.)] Zeitschr. Bot. 11: 212–214. 1919.

2184. RENNER, O. [Rev. of: (1) HAECKER, V. **Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. (Developmental analysis of characters, (Phaenogenetics.) General problems of development, heredity and eugenics.)** *x + 344 p., 181 fig.* Gustav Fischer: Jena, 1918. (See Bot. Absts. 1, Entry 1216.)] (2) IDEM. **Entwicklungsgeschichtliche Vererbungsregel. (Embryological analysis of characters or of races.)** Zeitschr. indukt. Abstamm. Vererb. 14: 260–280. 1915. (3) IDEM. **Über eine entwicklungsgeschichtliche Vererbungsregel.** (On an embryological rule of heredity.) Zeitschr. indukt. Abstamm. Vererb. 18: 1–21. 1917.] Zeitschr. Bot. 11: 201–205. 1919.

2185. ROBERTS, H. F. **Darwin's contribution to the knowledge of hybridization.** Amer. Nat. 53: 535–554. Nov.-Dec., 1919.—Darwin observed that crossability is not determined by systematic affinity, and noted the differential facility of making reciprocal crosses, (which he compares with differential success of reciprocal grafts), and the differential fertility of hybrids produced thereby; but the degree of facility of crossing is no measure of fertility of hybrid produced. He was surprisingly familiar with facts of self-sterility and felt that the problem was far from solved. He clearly visualized hybrid vigor (height and weight) as proportional to degree of difference (not necessarily external differences) between parents of the cross, whether or not they had been crossed or selfed during previous generations. He observed increased resistance and earlier flowering of hybrids and explained them as due to the fact that forms used in the cross had been exposed to different conditions, bringing a differentiation in their sexual elements (he thought this explained self-sterility also), and claimed to have proved that if such differentiation had not taken place the different flowers on the same plant did not bring vigor, even when these flowers differed in appearance. Relative weight of seeds produced by a cross and a selfing was 100:96; relative germinating ability was dubious. In crosses among 57 species of 52 genera, relative height of hybrids to inbreds was as 100:86. Hybrid vigor was transmitted to F_2, and was sometimes accompanied by decreased fertility. He was not much interested in transmission of characters to hybrids and says that intermediacy is the usual thing, sometimes "prepotency," and "some characters refuse to blend." He got in F_2 a ratio of 88:37 but did not visualise 3:1. Prepotency "sometimes depends on the same character being present and visible in one parent and latent or potentially present in the other. "Reversion was the coming to light of a latent character." "The elements of both parent species exist in every hybrid in a double state, namely, blended together and completely separated." "When two hybrids pair, the combination of pure gemmules derived from the one hybrid with the pure gemmules of the same

parts derived from the other would necessarily lead to complete reversion of a character.—Hybridised gemmules derived from both parent hybrids would simply reproduce the original hybrid form." "Act of crossing tends to bring back long lost characters not proper to the immediate parent form." He observed somatic segregation in F_1 and doubted whether the length of time a character had been inherited had any influence on its fixedness. He also observed sex-linked inheritance.—*Merle C. Coulter.*

2186. ROBERTS, HERBERT F. **The contribution of Carl Friedrich von Gärtner to the history of plant hybridization.** Amer. Nat. 53: 431–445. Sept.–Oct., 1919.—Selected quotations and brief comments. In 1836 Gärtner received a prize for the first satisfactory demonstration of fact of hybridization in plants; 1849, published results of 25 years' work, involving 10,000 separate experiments in crossing. Classed hybrids: (1) intermediate types,—occasional cases where one parent contributed more strongly being due to "slight overbalance of one or other fertilization materials;" (2) commingled types, each parent contributing certain characters; (3) decided types, one parent being prepotent. Visualized determination of hybrid characters **not** due, "not to mass and relationship of germinal materials," but to "vital modification of formative force." Essential nature of a species consists in definite relation of its sexual forces to other species (crossability), not necessarily in morphological features. No thought of unit characters; hybrid types "must be compared in their totality." Variation in F_2 described but not explained. Identical results of reciprocal crosses emphasized. Decided against xenia in corn, unfortunately using pericarp color, but got positive results with peas (yellow and green seeds). Emphasized necessity of pure parent types, and repetition of experiments using different individuals. Hybrid vigor seen clearly, and its agricultural possibilities considered.—*Merle C. Coulter.*

2187. SALMON, C. E. **Papaver Rhaeas, P. dubium and the hybrid between them.** New Phytol. 18: 111–117. *7 fig.* Mar.–April, 1919.—Author presents evidence indicating that wild plants at first taken to represent a variety of *Papaver dubium* are hybrids between *P. dubium* and *P. Rhaeas*. Significant characters of parents and hybrids are listed and conclusion is drawn that some characters of the hybrids belonged to one parent, some to the other, whilst a few were perfectly intermediate. The hybrids were completely sterile.—*T. H. Goodspeed.*

2188. SALMON, C. E. **A hybrid Stachys.** Jour. Linnean Soc. London (Bot.) 44: 357–362. *1 fig.* May 16, 1919.—Paper is of taxonomic interest chiefly. *S. germanica* is 75 cm. high; *S. alpina* is 60 cm.; *S. digenea*, a natural hybrid between the two, is 107 cm.—*Merle C. Coulter.*

2189. SALMON, E. S. **On forms of the hop (Humulus lupulus L.) resistant to mildew (Sphaerotheca humuli (DC) Burr.); II.** Jour. Genetics 8: 83–91. Apr., 1919.—Continuation of earlier experiments (Jour. Agric. Sci. 3: 455, 1917) which indicated that certain individual seedlings of wild hop, obtained from Vittorio, Italy, and female variety with yellow leaves known as "golden hop" were both resistant to attacks of Hop-mildew (*Sphaerotheca humuli* (DC.) Burr). Inoculation experiments with these two groups of "immune plants" continued with the result that seedlings of first group when grown in greenhouse were immune as regards leaf and stem during two consecutive seasons although when planted out in the hop garden susceptibility appeared late in the growing season in the case of leaf and "hop." Greenhouse plants may show local susceptibility without the general immunity being lost. In second group the yellow-leaved female variety is found to be immune while corresponding male variety is susceptible.—*T. H. Goodspeed.*

2190. SCHMIDT, JOHANNES. **Der Zeugungswert des Individuums beurteilt nach dem Verfahren kreuzweiser Paarung. [Individual potency, based on experiences in cross-matings.]** *8 vo., 40 p.* Gustav Fischer: Jena, Germany. 1919.—Translation from a Danish manuscript, dealing with inheritance of quantitative characters. Knowledge of individual potency often has great theoretical or practical significance, for instance in the selection of individuals for

further breeding. The methods and investigations here described may have a practical application, so that the book has special value for plant and animal breeders, as well as for the geneticist. [From publisher's announcement, Zeitschr. Bot. 11: cover page 4. 1919.]—*Geo. H. Shull.*

2191. SCHMIDT, JOHS. **Racial studies in fishes. II. Experimental investigations with Lebistes reticulatus (Peters) Regan.** Jour. Genetics 8: 147–153. *1 graph.* June, 1919.—The author is working on the question whether, or to what extent, quantitative racial characters are hereditary. The tropical-American Cyprinodont *Lebistes reticulatus* (Peters) Regan, a little aquarium fish, was used because it breeds rapidly, and the young possess at birth the full number of vertebrae, dorsal rays, etc. The experiments fall into two groups. In the first, the temperature of the water was varied for one pair of parents from one period of pregnancy to the other and the number of rays in the various broods counted. The results show that the different broods do exhibit a difference in the number of dorsal fin rays, and the number of rays was greater where the young had been developed at a high temperature than where their development took place at a lower temperature. In the second, different pairs of parents were kept in the same environment, the same water. One set of parents both had 6 rays and in the other set both had 8 rays. The tables show that the average number of rays approximates that of the parents, respectively, and is therefore genotypical in nature. The author concludes that a fish "race" is largely a statistical conception, implying a mixture of genotypes, with the environment acting only secondarily.—*R. K. Nabours.*

2192. SCHMIDT, J. **Investigations on hops (Humulus lupulus). XI. Can different clones be characterized by the number of marginal teeth in the leaves?** Compt. Rend. Lab. Carlsberg 14: 1–23. *8 fig.* 1918.—A statistical study was made of difference in number of marginal teeth on terminal lobes of leaves borne on secondary axes to determine whether the variations were an expression of genotypic differences or were merely phenotypic. The leaves studied were obtained from plants of the same clone observed through three different years, plants from the same clone grown under different external conditions in the same year, plants from different clones, and from hybrid plants the parents of which showed great divergence in respect to the character under consideration. Author concludes that although the number of teeth in the margin of leaves of the hop plant is largely affected by environment, nevertheless there are differences between clones in respect to the number of leaf-teeth, which are independent of external conditions.—*W. W. Stockberger.*

2193. SEILER, J. [Rev. of: DONCASTER, L. **Chromosomes, heredity and sex: A review of the present state of the evidence with regard to the material basis of hereditary transmission and sex-determination.** Quart. Jour. Microsc. Sci. 59: 487–521. 1914.] Arch. Zellforsch. 15: 141–143. 1919.

2194. SEILER, J. **Chromosomenstudien an Mischlingen. [Chromosome studies on hybrids.]** [Rev. of: FEDERLEY, HARRY. (1) Die Chromosomenconjugation bei der Gametogenese von Smerinthus populi var. austanti × populi. Ein Beitrag zur Frage der Chromosomenindividualität und der Gametenreinheit. (Chromosome conjugation in the gametogenesis of Smerinthus populi var. austanti × populi. A contribution to the individuality of the chromosomes and purity of the gametes.) Öfversigt Finska Vetensk. Soc. Forhandl. 57: 1–36. 1914–1915.—(2) IDEM. Die Spermatogenese des Bastards Dicranura erminea ♀ × D. vinula ♂. (Spermatogenesis of the hybrid Dicranura erminea ♀ × D. vinula ♂). *Ibid.* 57: 1–26. 1914–1915.—(3) IDEM. Die Spermatogenese des Bastards Chaerocampa porcellus ♀ × elpenor ♂. (Spermatogenesis of the hybrid Chaerocampa porcellus ♀ × elpenor ♂). *Ibid.* 58: 1–17. 1915–1916.] Arch. Zellforsch. 15: 137–139. 1919.

2195. SEILER, J. [Rev. of: HAASE-BESSELL, GERTRAUD. **Digitalisstudien I. (Digitalis studies I.)** Zeitschr. indukt. Abstamm. Vererb. 16: 293–314. 1916.] Arch. Zellforsch. 15: 143. 1919.

2196. SEILER, J. [Rev. of: HARRISON, J. W. H., AND L. DONCASTER. **On hybrids between moths of the geometrid sub-family Bistoninae, with an account of the behaviour of the chromosomes in gametogenesis in Lycia (Biston) hirtaria, Ithysia (Nyssia) zonaria and in their hybrids.** Jour. Genetics 3: 229-248. 1914.] Arch. Zellforsch. 15: 139-140. 1919.

2197. SHEWARD, T. **How varieties of fruit and flowers are originated.** Gard. Chron. Amer. 23: 118. *1 fig.* 1919.—Brief directions for amateur plant breeders accompanied by a popular presentation of the theories involved.—*John Bushnell.*

2198. SLOCUM, ROB. R. **Standard varieties of chickens. III. The Asiatic, English, and French classes.** U. S. Dept. Agric., Farmers' Bull. 1052. *32 p., 31 fig.* 1919.—Brief, popular, illustrated descriptions of Asiatic, English and French fowl as they are bred in America.—*H. D. Goodale.*

2199. SNYDER, N. **Wheat breeding ideals.** Jour. Amer. Soc. Agron. 10: 113-119. 1918. —A discussion of the great value of wheat as a food is given and it is pointed out that for generations man must have so considered it and thus propagated wheat as his chief bread-making cereal. It is held that in wheat improvement bread-making quality should always be considered and no new wheat be recommended on account of its high yield or other characters unless it possesses high bread-making qualities. The quantity and quality of gluten should be considered.—*H. H. Love.*

2200. STAKMAN, E. C., H. K. HAYES, OLAF S. AAMODT, AND J. G. LEACH. **Controlling flax wilt by seed selection.** Jour. Amer. Soc. Agron. 2: 291-298. *Pl. 9.* 1919.—See Bot. Abstr. 3, Entry 2766.

2201. STARK, P. **Die Blütenvariationen der Einbeere.** [Floral variations of Paris quadrifolia.] Zeitschr. indukt. Abstamm. Vererb. 19: 241-303. *55 fig.* Aug., 1918.—Variations in floral structure are described. The whorls of leaves, sepals, petals, anthers and carpels, normally in groups of 4, may undergo local changes of metamorphosis, splitting, increase or decrease of members, or the arrangement of whorls may be changed. There is a high degree of positive correlation between the number of members in various whorls. Increase of members of each whorl begins with the leaf whorl and progresses towards the carpels, while the reverse is true of decrease of members. These flower variations are due to nutrition, space relations of the growing point, and anatomy of fibrovascular bundles. Author concludes that above phenomena are of phylogenetic significance and believes that the floral diagram of *Paris* is a development from the *Trillium* type.—*Karl Sax.*

2202. SUMNER, FRANCIS B. **Adaptation and the problem of "organic purposefulness."** II. Amer. Nat. 53: 338-369. July-Aug., 1919.—A continuation of a paper of a somewhat philosophical nature, considering first, trial and error in regulation, and second, evolution and contingency. Author asserts trial and error principle is the only explanation of adaptive responses where racial or individual experiences are lacking. Cites arguments from JENNINGS, HOLMES, and ROUX, indicating trial and error applicable to physiological processes. Prefers to believe invisible trial and error processes involved in morphogenesis, rather than abandon to a vitalistic interpretation. Gene-character relationship is not indicative that entire organism is developed by such "particle" combination. Sequence-space relationship is still to be explained. Bodies both inorganic and organic tend to maintain functional equilibrium, the intervening "fortuitous" steps being proportionate to specific complexity—e.g., regeneration of a crystal; regeneration of a mutilated organism; solution of a problem by the mathematician. Random responses of organism in new situation *is* ioversely proportional to complexity of problem since the greater the complexity, the greater the number of racial experiences entering into the situation, and the greater the number of reactions that may have been selected. Author suggests that in evolution, inheritance of environmental modifications and selection of variations have both occupied a place. Unfavorable environment may disturb

germinal material so that new variations arise in direction of need, assuming that there may have been previous adaptive modifications of the "parent-body." Defends thesis that special adjustment between organism and environment arose by chance, although chance is not to be defined as "uncaused." Author objects to considering genetics synonymous with Mendelism. [See Bot. Absts. 3, Entry 2518.]—*L. B. Walton.*

2203. Sydelics, N. E. **Generationsväxlingens biologiska betydelse. [The biological importance of the alternation of generations.]** Botaniska Sektionens af Naturvetenskapliga Studentsällskapets i Uppsala förhandlingar. Svensk Bot. Tidskr. 1918: 487–490. Mar. 19, 1919.—Author criticizes theory of Bower and Wettstein on the origin of alternation of generations as connected with the vegetable kingdom's transition and accommodation from life in water to life on land. Among the Phaeophytes the same development concerning the relative condition between gametophyte and sporophyte is to be seen as in the ferns and seed plants. This circumstance however is in these algae not connected with radically changed external conditions of life.—The principal importance of the reduction-division is to make possible new combinations of the chromosomes. (1) When fertilisation is compensated by *one* reduction division only two different combinations of chromosomes are possible. (2) When fertilization is compensated by *many* reduction-divisions (several mother cells) a great number of combinations are possible.—The origin of a diploid sporophyte by postponement of the reduction division furnishes possibilities for the plant to produce a large number of reduction divisions and by this an increased number of combinations of allelomorphs. Thus the genesis of higher types as a result of this fertilization is made possible.—The theory is supported by the distribution of the two types in the vegetable kingdom. Type 1 includes: Flagellates, Diatomeae centricæ, Conjugates and Chlorophyces, haplobiont Rhodophyces and Phycomycetes. Type 2 contains: Diatomeae pennatae, diplobiont Rhodophyces, Thaeophyees, Myxomycetes, Ascomycetes and Basidiomycetes (3) and all Bryophytes, Gymnosperms and Angiosperms.—Type 1 (one fertilization and one reduction division) thus includes more primitive and simply organized forms of plants. Type 2 (one fertilization and many reduction divisions) contains plants which really have reached a higher degree of evolution. —Possibly the evolution has gone from *haploid haplobionts* (*Spirogyra* type) to *haploid* and *diploid diplobionts* (*Dictyota* type) and finally to *diploid haplobionts* (*Fucus, Plumbagella* and other phanerogams).—*K. V. Ossian Dahlgren.*

2204. Sylvén, N. **Några anmärkningsvärde enar. [Some peculiar specimens of Juniperus communis.]** Skogsvårdsföroni. Tidskr. 1918: 656–662. *6 fig.* 1918.—Author describes a spontaneous variation of *Juniperus communis* from Tulseboda in Blekinge (southern Sweden), that agrees with the cultivated *Juniperus communis pendula* (*B. reflexa* Parl.).—*K. V. Ossian Dahlgren.*

2205. Transeau, Edgar Nelson. **Science of plant life.** *14 × 19 cm., v + 336 p., 194 fig.* World Book Co.: New York, 1919.—Pages 220–228 contain six short paragraphs on "plant breeding," "variations," "two kinds of variation," "mutation," "hybridization" (17 lines in which Mendelian inheritance is only vaguely suggested), and "selection." On p. 325 is also a short paragraph on "plant breeding and evolution."—*Geo. H. Shull.*

2206. Van Fleet, W. **New everbearing strawberries.** Jour. Heredity 10: 14–16. *2 fig.* Jan., 1919.—Several varieties of strawberries in which the runners are largely suppressed and successive fruiting crowns formed are all descendants of Pan American, a sport or mutation of the Bismark, a variety of *Fragaria virginiana* type. This everbearing tendency appears in some of the hybrids and seedlings of Pan American. Progressive and Superb are the most popular varieties though they may be deficient in productiveness and plant-making capacity. Seedlings from present everbearing varieties, and crosses with spring-fruiting commercial varieties and varieties of the European Alpine strawberry, *Fragaria vesca*, which naturally fruits over a long season have been made with the hope of developing varieties of additional value. *F. vesca* in the European and Mexican Alpine forms has rarely proved worth cultivating.—Several seedlings of the *F. vesca* type from seeds forwarded by W. F. Wight from Chile,

showed greater vigor, fruitfulness and general adaptation than any Alpine hitherto introduced. Plants under the introduction Nn. 35005 have been disseminated in a limited way for trial. Crosses between it and Chesapeake and Early Jersey Giant were made under glass and 400 of the seedlings which fruited in June, 1917, showed high average as June-fruiting varieties, but with no obvious tendency toward continuous fruiting. Runners from two of the best were brought into bloom and again pollinated with 33005 and of 150 seedlings, 4 bore handsome large berries continuously from July until November and a good supply of vigorous runners. If then, the everbearing Pan American is a mutant, it is evident that everbearing forms may be obtained from other sources. [See Bot. Abstr. 2, Entry 732; 3, Entry 74.]—*M. J. Dorsey.*

2207. VAN FLEET, WALTER. **Progress in breeding Freesias.** Jour. Internat. Gard. Club 3: 232–239. June, 1919.—Author notes that "the original wild *F. refracta* was introduced into cultivation about 1816. It has a rather tortuous horizontal scape, with 5 or more blooms, bulging corolla tubes pointing irregularly up or down, and is lurid greenish-yellow with pronounced orange blotch, rather than clear white in its coloring." Florists soon started improvement. Forty years ago a superior variety appeared which had larger foliage and well shaped, almost pure white flowers, though retaining the deep yellow blotch. It came to be known as *F. refracta alba*, and it has since become the common garden variety. Further selection developed the pure white variety "Purity."—The yellow of the *F. refracta* was unpopular. A vigorous garden variety was found in a neglected Italian garden, which produced large well shaped blooms, with wide tubes, sulphur to deep yellow in color, free from greenish shades. It was named *F. Leichtlinii*. From it has been bred a charming yellow variety *F. Chapmanii*. By crossing *F. Leichtlinii* with *F. Armstrongii*, a new pink-flowering species, there has lately arisen some remarkable apricot-colored or flaming orange varieties.—Pink forms have been offered by nurserymen, but they are not well established and prove to be variants of *F. refracta alba*.—Author's work has been with *F. Armstrongii*, hybridizing it with other species. He has secured a large range of colors, including brilliant yellow, bright orange, copper red, various pink shades, rosy purple, and violet blue. Variations have also been obtained in form and color plan so that some resemble "star phlox" while others show indications of doubling. A desirable variation is a two-ranked cluster, which somewhat resembles an enlarged Trailing Arbutus. The best of the new varieties are usually sterile but may be propagated by corms. [See also anonymous rev.: Gard. Chron. 66: 95. 1919. (See also Bot. Abstr. 3, Entry 2077.)]—*C. E. Myers.*

2208. VON HORSTEN, N. **Ärftlighetslära.** [Genetics.] *17 × 26 cm., viii + 506 p., 191 fig. 1 colored pl.* P. A. Norstedt & Söners förlag: Stockholm, 1919.—This text-book is divided into five sections. In the first section—"phenotype and genotype,"—author treats the theory of transformation and of continuation, norm of reaction and modifications, the difference between personal qualities (phenotype) and genotypical constitution, pure lines and populations, and other related questions.—The second section (14 chapters) treats of hybridisation. After an explanation of the principles of Mendelism the author points out very particularly the relation between genetic qualities and exterior properties, polymeric factors, presence-absence-hypothesis and the nature of the factors, attempting to differentiate between factors —the formal units,—and genes, the real units, the nature of which is unknown. After treating of linkage phenomena, species hybrids, etc., this section ends with a chapter "On the traditional views of inheritance in the light of modern genetics," in which the author explains and criticises such expressions as variation, correlation, latency and atavism.—The third section deals with cytology, giving schematic tables (originals) and treats of the reduction division and different opinions about its nature; discusses segregation of hybrids as a cytological procedure (Morgan's crossing-over hypothesis); considers the experiments of Federly and others on the origin of constant hybrids, etc. Then follow three chapters on inheritance of sex and the chromosomes which determine sex. The author is not satisfied with the rather complicated sex formulae of Goldschmidt and criticises his potency hypothesis. Author uses the formulae ♀ *FF*, ♂ *Ff* resp. ♂ *MM*, ♀ *Mm*, which formulae correspond with cytological facts; he holds however that the sex-chromosomes do not determine sex itself and that un-

known and higher factors must exist which regulate the mechanism of the chromosomes and thereby determine sex.—Next follows a very extensive chapter on the development of new biotypes. The author explains in a very logical manner and by schematic illustrations existing possibilities for induction of a variation in descendants, similar to a variation of the parents caused by an outside impulse (modification in the embryonic state, "direct parallel-induction or modification," "direct parallel-induction of mutation," "indirect parallel-induction of mutation," and transmitting of a personal variation), and comes to the conclusion that no inheritance of modifications (acquired characters) takes place. He thus rejects the Lamarckian view and agrees with the opinion of the exact genetieists, but thinks it possible that some phenomena especially the "indirect induction of mutations," will form a connection between the views of exact genetics and Lamarekian ideas. The experiments of Kammerer are strongly critieized. Three chapters deal with mutations, their nature and origin. Author criticises not only all superfieial observation but also such esteemed investigations as Tower's experiments with *Leptinotarsa* and the American *Drosophila* experiments.—This section closes with an explanation of the relation between the theory of inheritance and theories of evolution, the importance of selection, and other evolutionary questions. Author points out that too little is known about mutations for discussing their relation to evolution, but theoretical possibilities must be considered.—In the fourth section the author discusses the importance of modern genetics for plant and animal breeding. In the last section he writes about the importance of the same principles for the human race. Referring to tables of pedigrees (partly carefully revised and more instructive than those in the original works) the author recounts some kinds of Mendelizing qualities in man, considers polymeric cases (criticising rather severely Davenport's opinion on the mulatto-question), and discusses sex-limited qualities of man. The last chapter is a well-written and moderate presentation of race-hygienical questions and aims.—*K. V. Ossian Dahlgren.*

2209. Waldron, L. R. **Cross-fertillzation in alfalfa.** Jour. Amer. Soc. Agron. 2: 259–266. 1919.—Two species of *Medicago, sativa* and *falcata*, were planted together in equal numbers to secure data on the amount of cross-fertilization taking place between the two species. Flowering records in the F_1 generation showed that the gametes of the *M. sativa* parent plants had united with gametes from the *M. falcata* plants to form mature sporophytes from *M. sativa*, to the extent of 7.48 per cent. From *M. falcata* 42.70 per cent of hybrid plants were produced. The disparity was due probably in the main to the comparative scarcity of both flowers and pollen in *M. falcata*. A slight, but perhaps significant, negative correlation was found to exist between amount of seed produced in the parent plants and the extent of cross-fertilization.—*F. M. Scherts.*

2210. Warburton, C. W. **The occurrence of dwarfness in oats.** Jour. Amer. Soc. Agron. 11: 72–76. *2 fig.* 1919.—In the course of studies of selections from certain oat varieties grown in head rows at the Aberdeen (Idaho) substation in 1916, one row of Victory oats produced 12 normal plants of the variety and 8 of an entirely distinct type, these 8 being simply dense tufts of basal leaves with occasional culms not over 9 inches in height, bearing very small panicles. These dwarf plants for the most part failed to mature seeds before frost, though watered and protected from injury. All seeds produced by both tall and dwarf plants in this row were saved.—The few seeds from dwarf plants of previous year were sown in 1917, and all viable ones produced dwarf plants exactly like parents. About 40 seeds from each of 10 of the 12 tall plants were sown in individual plant rows. Four of these 10 plants produced all tall plants and 6 produced both tall and dwarf plants, in the ratio of 2.55 to 1. Some rows, however, showed an exact 3 to 1 ratio.—In 1918, at Aberdeen, seed from the rows producing all tall plants in 1917 again produced all tall plants in 1918, the seed from dwarf plants in segregating rows produced dwarf plants, showing that dwarfness in this strain is recessive.—All the seeds from both the tall and dwarf plants in one segregating row were sent to Da. H. H. Love at Cornell University and from another row to Prof. H. K. Hayes at the Minnesota Station. The seed from the remaining 4 rows were planted by the author.—Summarising the results obtained at Ithaca, Aberdeen, and St. Paul, 65 tall plants out of 168 produced in

1917 from 6 families proved to be homozygous for tallness and 103 proved to be heterozygous, a preponderance of homozygous plants, as the expected numbers are 56 and 112. The 103 heterozygous plants produced 1536 tall and 514 dwarf plants, almost an exact ratio of 3 tall to 1 dwarf.—No adequate explanation of the sudden appearance of this dwarf form has yet been found.—*J. M. Beal.*

2211. WARREN, ERNEST. **The pure line hypothesis and the inheritance of small variations.** South African Jour. Sci. 15: 535–567. *Pl. 16.* 1919.—Author crossed a tall nasturtium (*Tropoeolum majus*) with large, uniform green leaves and pale yellow flowers as ovule parent with a dwarf variety (*T. minus*) with small variegated leaves and red flowers. Eleven of the twenty-one hybrids had over 90 per cent good pollen. The remaining ten had only from 2 to 41 per cent good pollen and produced, on the average, fewer seeds, of which a smaller average percentage germinated. The author considers it likely that defective ovules were associated with the bad pollen. Low fertility and poor germination were also encountered on selfing the pollen parent. The tall habit and unvariegated leaves were dominant over the dwarf habit and variegated leaves. Segregation occurred in both cases in approximately a 3 : 1 ratio. The two factors were linked in inheritance [the data indicating about 21 per cent crossovers]. Size of leaves did not segregate in a clear-cut fashion but was correlated closely with tallness and to a less extent with non-variegation, even among those with the same habit. There were clear indications of segregation in regard to yellow chromoplasts and red sap pigment but the mode of inheritance could not be determined from the data, there being a number of seemingly unaccountable cases. The progeny of different F_1 plants differed considerably in average degree of variegation, leaf width and intensity of red in the flowers. In the last case the correlation between F_1 parent and F_2 progeny was found to be 0.435. The author interprets the occurrence of these heritable fluctuations adversely to the pure-line theory.—*Sewall Wright.*

2212. WHIPPLE, GEORGE CHANDLER. **Vital statistics: An introduction to the science of demography.** *12 × 18 cm. v + 517 p., 63 fig.* John Wiley and Sons: New York, 1919. The book is an elementary treatment of the methods and material of vital statistics, including chapters on statistical arithmetic, graphs, enumeration and registration, general death rates, birth rates, marriage rates, specific death rates, causes of death, analysis of death rates, statistics of particular diseases, studies of death by age periods, probability, correlation, and life tables. The book is evidently intended for a popular text book, efforts are made to keep the subject from being "dry," and special emphasis is laid on the real and supposed fallacies of statistics.—*Sylvia L. Parker.*

2213. WHITBY, STAFFORD. **Variation in Hevea brasiliensis.** Ann. Botany 33: 313–321. *1 diagram.* July, 1919.—Determinations of the rubber-content of the latex, the rubber-yield, and the trunk-girth for the individual trees of a population of 1011 7-year old trees being tapped by a V-cut on half the circumference at a level of about 30 inches, and forming an apparently normal area of plantation rubber in the Malay States, showed the following results.—(a) *The rubber-content of the latex ranged from 23 to 55 per cent.* The mean value was 36.58 ± 0.25 per cent. σ 5.86 ± 0.17 per cent, C.V. 16.02 ± 0.49 per cent. (b) The rubber-yield for a given tree remained approximately constant. The frequency curve referring to rubber-yield showed a marked positive skewness. Mean yield, 7.12 ± 0.115 grams, σ, 5.425 ± 0.08. Mode (by inspection), 4 grams C.V., 76.19 ± 1.14 per cent. Coefficient of skewness (on σ), + 0.575. As indicating the character of the yield distribution, it is noted that, on the one hand, 9.6 per cent of the trees (trees giving twice the mean yield or more) was contributing 28 per cent of the total yield, and, on the other hand, *13.7* per cent of the trees (trees giving 0.2 gram) was contributing only 2.9 per cent of the crop. The highest yielders in the population were 4 trees giving from 41 to 43 grams per diem. (c) The correlation between trunk-girth and latex-yield is positive, but not very high, being + 0.260 ± 0.020.—*S. Whitby.*

2214. Whiting, P. W. **Inheritance of white-spotting and other color characters in cats.** Amer. Nat. 53: 473–482. Nov.-Dec., 1919.—Previous work by author on inheritance in cats is summarized, and in addition new findings are added. The inheritance of various types of ticking and of the different degrees of white-spotting (including self-white) are discussed. Restricted white spotting is considered dominant to self-pigmented. Self-white is also dominant to self-pigmented.—"The principle is suggested that there is a quadruple allelomorphic series: W_s solid white; w^m, much spotted; wl, little spotted; and w, self, with dominance in the degree of decreasing pigmentation."—*H. L. Ibsen.*

2215. Whiting, P. W. **Genetic studies on the Mediterranean flour-moth, Ephestia kühniella Zeller.** Jour. Exp. Zool. 28: 413–445. *2 pl., 1 fig.* July 5, 1919.—Taxonomy, distribution, source of the material used and technique are discussed. Low fertility due mostly to defective oviposition was experienced. Variations in size are apparently not hereditary while characters relating to leg spines and external male genitalia have not been tested. Environment appears to affect inheritance of defective labial palpi. The abnormality of cleft tongue is inherited but depends on environmental conditions, among which humidity is important, for its expression. In color inheritance sooty is a simple dominant to type, and black a simple recessive, while in the homozygous black moths sooty acts as a recessive. This the author considers a case of reversed dominance due to a simple Mendelian difference. Variations in quantity of a color producer and a color inhibitor are supposed to determine color variations, and a chart illustrating this conception accompanies.—*R. K. Nabours.*

2216. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Monthly Bull. State Comm. Hortic. California 7: 568–573. Oct., 1918.—Practice of planting commercial apple orchards in alternate varieties to cause normal development of fruit is upheld. No benefit is derived in size, color, shape or quality, from foreign pollen. Conclusions based on results of hand-pollinations of varieties Ben Davis, Jonathan, Winesap and Grimes.—*T. H. Goodspeed.*

2217. Yamaha. [Rev. of: Allard, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of Nicotiana rustica.** Amer. Nat. 53: 234–238. 1919. (See Bot. Absts. 2, Entry 1195; 3, Entry 217.)] Bot. Mag. Tôkyô 33: 166–167. 1919.

2218. Yamaha. [Rev. of: Weatherwax, P. **Gametogenesis and fecundation in Zea mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73–90. 1919. (See Bot. Absts. 2, Entry 717.)] Bot. Mag. Tôkyô 33: 165–166. 1919.

2219. Zalla, M. [Rev. of: Benard, R. **Neuf cas de polydactylie héréditaire au cours de cinq générations. La polydactylie dans ses rapports avec les lois de Mendel.** (Nine cases of hereditary polydactyly in five generations. Polydactyly in its relation to Mendel's law.) Nouvelle Iconogr. Salpétrière 28[1]: 1916–1917.] Riv. Patholog. Nerv. Ment. 24: 127–128. 1919.

2220. Zeleny, Charles. **A change in the bar gene of Drosophila involving further decrease in facet number and increase in dominance.** Jour. Gen. Physiol. 2: 69–71. Sept. 20, 1919.—In a "downward" selection experiment with "bar"-eye stock of *Drosophila melanogaster* (bar eye being characterized by a small number of facets), author obtained an "ultra-bar" mutant giving rise to a race having about one-third as many facets as bar. Ultra-bar acts as a dominant allelomorph of bar and has a much greater degree of dominance over normal than has bar. It probably represents a "second mutation in the same germinal material and in the same direction as a previous mutation." It occurred in the direction of selection. —*Chas. W. Metz.*

HORTICULTURE

J. H. GOURLEY, *Editor*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

2221. ANONYMOUS. **Annual poppies at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 483–487. 1919.—A report of the trial of 56 stocks of annual poppies at Wisley, England, in 1917. A list of the varieties, brief descriptions and the awards of the committee are given.—*J. K. Shaw.*

2222. ANONYMOUS. **Bulbs in fiber.** Gard. Chron. Amer. 23: 15. 1919.

2223. ANONYMOUS. **Decorative perennials for continuous bloom.** Gard. Chron. Amer. 23: 75. 1919.

2224. ANONYMOUS. **Delphiniums at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 462–477. 1919.—Three plants each of 229 stocks of perennial Delphiniums were received for trial at Wisley, England, in the autumn of 1915. Brief descriptions of the different varieties are given, also the awards of the committee.—*J. K. Shaw.*

2225. ANONYMOUS. **Eradicating European barberry.** Gard. Chron. Amer. 23: 15. 1919.

2226. ANONYMOUS. **A review of yellow roses.** Gard. Chron. [London] 65: 81, 92–93. 1919. —A review of the work done on developing yellow roses giving the good and bad points of the varieties now in cultivation. Shows progress that has been made in the last 20 years, but concludes that no entirely satisfactory yellow rose has been produced. A large list of varieties with short descriptions is given.—*H. C. Thompson.*

2227. ANONYMOUS. **Mysotis at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 478–482. 1919. —A report of the trial of 101 stocks of Mysotis at Wisley, England, in 1916–17. A list of the varieties, brief description and the awards of the committee are given.—*J. K. Shaw.*

2228. ANONYMOUS. **Phoenix Roebelinii.** Gard. Chron. Amer. 23: 15. *1 fig.* 1919.

2229. ANONYMOUS. **The best of the Forsythias.** Horticulture 29: 426. *1 fig.* 1919.

2230. ANONYMOUS. **Weeping trees.** Gard. Chron. Amer. 23: 17. *1 fig.* 1919.

2231. ANONYMOUS. **Standard roses.** Gard. Chron. Amer. 23: 17. *1 fig.* 1919.

2232. ANONYMOUS. **The new hydrangeas.** Gard. Chron. Amer. 23: 72. *1 fig.* 1919.

2233. ANONYMOUS. **The box-barberry.** Gard. Chron. Amer. 23: 43. *1 fig.* 1919.

2234. ANONYMOUS. **The Fraxinella (Dictamnus albus).** Gard. Chron. Amer. 23: 206. *1 fig.* 1919.

2235. ANONYMOUS. **The valuable Japanese yew.** Horticulture 29: 443. *1 fig.* 1919.

2236. ANONYMOUS. **Trailing arbutus bush.** Amer. Bot. 25: 27. 1919.—*Abelia grandiflora* is shown to be hardy in northern Illinois. Though killed to the ground each year it produces new shoots and many flowers every season.—*W. N. Clute.*

2237. ANONYMOUS. **Utility of rhododendrons.** Gard. Chron. Amer. 23: 12, 13. *3 fig.* 1919.

2238. ANONYMOUS. [Rev. of: **Report of the National Botanic Gardens, Kirstenbosch, 1916–18.**] South African Gard. and Country Life 9: 309. 1919.

2239. Anonymous. **Plants in the aroid house.** Missouri Bot. Gard. Bull. 7: 35–38. *Pl. 7.* 1919.—A list of 172 species and varieties of aroids.—*O. T. Wilson.*

2240. Anonymous. **The Iceland poppy.** Gard. Chron. Amer. 23: 162. *1 fig.* 1919.

2241. Bean, W. J. **Deutzia compacta.** Curtis Bot. Mag. 15: *Pl. 8796 (colored).* 1919.—A shrub, native of China, from three to six feet in height, with white flowers tinged with rose; it flowers in July after danger of late frosts has passed and is one of the latest of Deutzias to flower, coming at a season when shrubs in flower are scarce, thus enhancing its value.—*Oliver A. Farwell.*

2242. Bowles, E. A. **Monograph for an amateur gardener's library.** Jour. Roy. Hortic. Soc. 43: 359–371. 1919.

2243. Buewell, W. M. **Spurred butterfly pea.** Amer. Bot. 25: 112. 1919.

2244. Charles, Mrs. M. E. S. **Germination of wild cucumber.** Amer. Bot. 25: 66. 1919.—Seeds of *Echinocystis lobata* do not germinate well if kept dry over winter, but seeds that had been lying on a cement floor for a year produced thrifty vines the second spring.—*W. N. Clute.*

2245. Clute, Willard N. **The opening of flowers.** Gard. Chron. Amer. 23: 87–88. 1919.

2246. Clute, Willard N. **Causes that produce the colors of plants.** Gard. Chron. Amer. 23: 232. 1919.

2247. Clute, Willard N. **The structure of plants.** Gard. Chron. Amer. 23: 278–279. 1919.

2248. Clute, Willard N. **The science of flower-gathering.** Gard. Chron. Amer. 23: 127. 1919.—Methods of prolonging the life of cut flowers are discussed.—*W. N. Clute.*

2249. Clute, Willard N. **Defining double flowers.** Gard. Chron. Amer. 23: 189. 1919.

2250. Clute, Willard N. **Flowers that are not flowers.** Gard. Chron. Amer. 23: 49–50 1919.—Compositae and other flower clusters are discussed.—*W. N. Clute.*

2251. Clute, Willard N. **Hardy houseleeks.** Amer. Bot. 25: 68. 1919.—*Sempervivum tectorum* reported as enduring temperatures of −20°F. in northern Illinois. The plants are noted for seldom blooming, but these plants bloomed the following year.—*W. N. Clute.*

2252. Correvon, H. **Icones florae alpinae plantarum.** [Illustrations of alpine flora.] II¹. *89 p., 17 pl., 25 fig., 14 distribution maps.* [No date; copy received June 2, 1919.]—See Bot. Abstr. 3, Entry 2972.

2253. Correvon, H. **Icones florae alpinae plantarum.** II¹⁰. *36 p., 18 pl., 25 fig.* 16 distribution maps. [No date; copy received June 2, 1919.]—See Bot. Abstr. 3, Entry 2973.

2254. Cremata, Merlino. **Cercas, alambradas y setos en Cuba.** [Fences and hedges in Cuba.] Revist. Agric. Com. y Trab. 2: 330–334. 1919.—The plants suitable for hedges in Cuba are described under the headings defensive hedges, hedges for adornment, for shelter and for fruit. Bibliography appended.—*F. M. Blodgett.*

2255. Donald, James. **The rock garden.** Gard. Chron. Amer. 23: 190, 191. *2 fig.* 1919.

2256. Easlea, Walter. **Mildew resistant roses; with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. 43: 253–260. 1919.—This paper is a discussion of breeding roses for mildew resistance. A list of varieties more or less resistant to mildew is appended. [See Bot. Abstr. 3, Entry 2119.]—*J. K. Shaw.*

2257. FARR, BERTRAND H. The peony and its people—from amateur to professional. Flower Garden 6: 102. 1919.

2258. FIELDER, C. R. Trees and shrubs for autumn and winter effect. Jour. Roy. Hortic. Soc. 43: 340–345. 1919.

2259. HATFIELD, T. D. Endurance of coniferous trees at Wellesley, Mass. Horticulture 29: 125–126. 1919.—Upwards of 75 species and forms of conifers listed, with notes on their resistance to the winter of 1917–1918.—*W. N. Clute.*

2260. HUTCHINSON, J. Rhododendron auriculatum. Curtis Bot. Mag. 15. *Pl. 8786 (colored).* 1919.—A white flowered species of central China, being the latest to flower both in its native habitat and in gardens. It may become the source of races of late flowering hardy hybrids. At Kew it has been fertilized by the pollen of belated flowering forms of *R. Ponticum* Linn. and of *R. decorum* Franch. Flowers fragrant. Leaves finest of all Rhododendrons. Hardy in the valley of the Thames. Should be protected from the midday sun.—*Oliver A. Farwell.*

2261. HUTCHINSON, J. Rhododendron callimorphum. Curtis Bot. Mag. 15. *Pl. 8789 (colored).* 1919.—A rosy red species of *Rhododendron* from south western Yunnan where it grows at an elevation of 10,000 feet. Fairly hardy in England. The long petioles of the cordate, ovate-orbicular leaves are conspicuously covered with long stalked glands. An upper leaf is sometimes reduced and spatulate as in the section *Azolea* of the Genus.—*Oliver A. Farwell.*

2262. HUTCHINSON, J. Primula tibetica. Curtis Bot. Mag. 15. *Pl. 8796 (colored).* 1919.—A rose-purple flowered species allied to *P. sibirica* and a native of the Sikkim and Bhutan Himalayas. A pronounced yellow eye and gibbous bracts are distinctive features of this species.—*Oliver A. Farwell.*

2263. HUTCHINSON, J. Primula bellidifolia. Curtis Bot. Mag. 15. *Pl. 8801 (colored)* 1919.—This plate represents a species of the *Capitata* with violet colored corollas and is considered to be the East Himalayan representative of *Primula farinosa* Linn. It is distinguished by its doubly toothed, membranous leaves, strigose pubescent on both surfaces.—*Oliver A. Farwell.*

2264. HUTCHINSON, J. Rhododendron oleifolium. Curtis Bot. Mag. 15. *Pl. 8802 (colored).* 1919.—A low shrub, not over 2–3 feet in height, native of Yunnan at altitudes of 6000–10,000 feet. The flowers, white to pale rose, are solitary and axillary; the shrub may flower when 2 years old. Probably will prove to be a hardy Rhododendron. Related to *R. racemosum* from which it is distinguished by longer and more narrow leaves.—*Oliver A. Farwell.*

2265. HUTCHINSON, J. Desmodium cinerascens. Curtis Bot. Mag. 15. *Pl. 8805 (colored).* 1919.—The species figured is a native of western China and bears rose carmine flowers late in the season (October). A hardy shrub, 3 or 4 feet high, with purplish twigs. It may be increased by late summer cuttings. It is related to *D. tiliaefolium, D. nutans,* and *D. argenteum* of India.—*Oliver A. Farwell.*

2266. JOHNSTON, EARL LYND. The sand lily. Amer. Bot. 25: 52–54. 1919.

2267. JUDD, WM. H. Ornamental trees and shrubs of merit for New England. Horticulture 29: 175. 1919.

2268. LODUÑIZUS. Arboles para tapar medianerias. [Trees for boundary lines.] Informacion Agric. [Madrid] 9: 59. 1919.—*Cupressus, Eucalyptus* and *Populus* are recommended for good soils and the elm for poorer situations.—*John A. Stevenson.*

2269. Lonbrizus. **Los rosales no deben podarse en invierno.** [Roses should not be pruned in the winter.] Informacion Agric. [Madrid] 9: 9–10. *1 fig.* 1919.—Early spring considered the best time for pruning roses. Proper procedure to be followed for best results outlined.—*John A. Stevenson.*

2270. Lonbrizus. **Rosa wichuriana.** Informacion Agric. [Madrid] 9: 177. 1919.—The growing of this rose recommended because of hardiness, adaptability, and color range.—*John A. Stevenson.*

2271. Lonbrizus. **Multiplicacion del crisantemo.** [Chrysanthemum propagation.] Informacion Agric. [Madrid] 9: 121–123. 1919.—Describes the method of propagating by cuttings.—*John A. Stevenson.*

2272. Lonbrizus. **Setos vivos.** [Hedges.] Informacion Agric. [Madrid] 9: 150–151. *1 fig.* 1919.—*Maclura aurantiaca, Crataegus pyracantha* (espino ardiente) and *Rosa* sp. are recommended for planting. Methods of planting and cultivation are outlined.—*John A. Stevenson.*

2273. Main, M. Emerson. **Cultivating wild flowers.** Flower Grower 6: 32. 1919.

2274. Matouschek. [Rev. of: von Tubeuf, **Gärtnerische Kultur der Mistel.** (Culture of mistletoe.)] Mitteil. Deutsch. Dendrol. Ges. 1917: 188–196. *8 pl.* Zeitschr. Pflanzenkrankh. 29: 57–60. 1919.

2275. Meyer, Frank B. **The peony, the modern garden flower.** Gard. Chron. Amer. 23: 303. 1919.

2276. Nelson, J. C. **A freak foxglove.** Amer. Bot. 25: 88–89. *1 fig.* 1919.—The garden form of *Digitalis purpurea* known as *gloxinioides* (*monstrosa*) is figured and described.—*W. N. Clute.*

2277. Nelson, William. **Native Plants: Crotalaria sp.** South African Gard. 9: 224. 1919.

2278. Ora, Helen. **Garden flowers of springtime.** Gard. Chron. Amer. 23: 193. 1919.

2279. Pescott, Edward E. **The Australian flora from an ornamental aspect.** Jour. Dept. Agric. Victoria 17: 360–364. *Pl. 4.* 1919.—Several varieties of wattle (*Acacia*) are described which serve for ornamental purposes. They are adaptable to almost any soil, except where stable manure is used. The natural habitat is a hard dry stony soil, it does not thrive under excessive moisture conditions.—*J. J. Skinner.*

2280. Rolfe, R. A. **Isabelia virginalis.** Curtis Bot. Mag. 15: *Pl. 8787* (*colored*). 1919.—An epiphytic orchid of the tribe *Epidendreae* hut with the habit of a *Maxillaria.* Native of Brazil. Flowers single rather inconspicuous, white, flushed with rose; pseudobulbs covered with scales.—*Oliver A. Farwell.*

2281. Rolfe, R. A. **Bulbophyllum robustum.** Curtis Bot. Mag. 15: *Pl. 8792* (*colored*) 1919.—An epiphytic orchid from Madagascar belonging to the tribe *Epidendreae.*—*Oliver A. Farwell.*

2282. Rolfe, R. A. **Govenia lagenophora.** Curtis Bot. Mag. 15: *Pl. 8794* (*colored*). 1919.—A Mexican terrestrial orchid with yellow and reddish-brown flowers on purple pedicels.—*Oliver A. Farwell.*

2283. Rolfe, R. A. **Liparis macracantha.** Curtis Bot. Mag. 15: *Pl. 8797* (*colored*) 1919.—One of the largest flowered species of the genus and a native of Formosa. It has large undulate leaves and a long raceme of vinous-purple flowers with very large serrate lips.—*Oliver A. Farwell.*

2284. ROLFE, R. A. **Wittia Panamensis.** Curtis Bot. Mag. 15: *Pl. 8799 (colored).* 1919. —These plants have stems like those of *Epiphyllum* but bear rather small deep purple flowers which appear at the bases of the crenations. This species is a native of Panama; *W. Amazonica* is a Peruvian species and is the generic type. A third species, *W. Costaricensis*, is found on the west coast of Costa Rica.—*Oliver A. Farwell.*

2285. ROLFE, R. A. **Calanthe tricarinata.** Curtis Bot. Mag. 15: *Pl. 8803 (colored).* 1919.—This is a terrestrial Orchid of the tribe *Epidendreae* and is a native of northern India and Japan where it is found at altitudes of from 5000 to 9000 feet. The flowers are yellowish green with a brownish red lip. This species and *C. Masuca* are the parents of the garden hybrid, *C. Harryana.*—*Oliver A. Farwell.*

2286. ROTH, RICHARD. **Yucca.** Horticulture 29: 104. *1 fig.* 1919.

2287. SHEWARD, T. J. **How to propagate bedding plants by cuttings.** Gard. Chron. Amer. 23: 47. *1 pl.* 1919.

2288. SHEWARD, T. **How to propagate perennials by cuttings and divisions.** Gard. Chron. Amer. 23: 170. *1 fig.* 1919.

2289. SHEWARD, T. **Sowing seed for next year.** Gard. Chron. Amer. 23: 77. *1 fig.* 1919.

2290. SKAN, S. A. **Ipomoea dasysperma.** Curtis Bot. Mag. 15: *Pl. 8788 (colored).* 1919. —Peculiar to the genus in having yellow flowers and saccate outer sepals. An attractive garden plant native in Tropical Asia and Africa. Has had many names, including, probably *I. saccata* Hallier f.—*Oliver A. Farwell.*

2291. SKAN, S. A. **Ipomoea Pes-tigridis var. longibracteata.** Curtis Bot. Mag. 15: *Pl. 8806 (colored).* 1919.—This variety comes from East Tropical Africa and is a climbing annual, reaching 6 feet or more. The flowers are white with the tube purplish without and violet within. It belongs to the section *Cephalanthae* characterized by the rather small flowers being arranged in dense bracteate heads. The typical species has a wide range extending from East Tropical Africa through southern Asia to China and the adjacent coastal Islands. It prefers a sandy soil.—*Oliver A. Farwell.*

2292. SMITH, A. **Berry-bearing plants and their ornamental value.** Gard. Chron. Amer. 23: 9–11. 1919.—All the berry-bearing plants likely to grow in the northern United States, with notes on their usefulness as ornamentals, are mentioned.—*W. N. Clute.*

2293. SMITH, ARTHUR. **The proper treatment of flowering shrubs.** Gard. Chron. Amer. 23: 196. 1919.

2294. STAFF, OTTO. **Protea longifolia.** Curtis Bot. Mag. 15: *Pl. 8995 (colored).* 1919.—A species of southern Africa that has had a cultural history approaching two centuries and as might be imagined has been described under a number of different names now reduced to synonymy. Three species, still kept distinct, *P. ignota*, *P. lugulaefolia* and *P. umbonalis* were based upon plants raised from seed at Schönbrunn. These are kept distinct from *P. longifolia* on the shape of the centre of the flowering head, length of the perianth-arms, and the coloring of the involucral bracts. Andrews considered them as but forms of *P. longifolia* and it is suggested that the differences are such as may be expected under the favorable conditions of our climate, the heads not developing perfectly and normally.—*Oliver A. Farwell.*

2295. TURRILL, W. B. **Lonicera similis, var. Delavayi.** Curtis Bot. Mag. 15: *Pl. 8800 (colored).* 1919.—This is a climbing, yellow flowered shrub of western China. It is a hardy evergreen, flowering as late as August. It thrives well in a loamy soil and can be increased by late summer cuttings.—*Oliver A. Farwell.*

2296. Turrill, W. B. **Lonicera chaetocarpa.** Curtis Bot. Mag. 15: *Pl. 8804 (colored).* 1919.—This species is a native of western China and is related to *L. hispida* Pall. of which it was originally considered to be a variety. A hardy shrub, about 5 feet in height, that bears yellow flowers and thrives well in any good loamy soil. It may be increased by cutting in July and August. Flowers in June.—*Oliver A. Forwell.*

2297. Watkins, S. L. **The western azalea.** Amer. Bot. 25: 51. 1919.

2298. Wilson, E. H. **A curious twist of facts about laurel.** Horticulture 29: 602. 1919. —A note in favor of protecting the State flower [*Kalmia*] of Connecticut.—*W. N. Clute.*

2299. Wright, C. H. **Aloe concinna.** Curtis Bot. Mag. 15: *Pl. 8790 (colored).* 1919.—A species of *Aloe* first discovered at Zanzibar but not since found in a wild state. It has increased by suckers and flowers in the autumn; a weak, erect or ascending, short stem is developed with small scattered leaves closely set with silvery white spots; an inclined inflorescence is suggestive of a more or less prostrate habit in the wild plants. It is of the section *Monostachyae.*—*Oliver A. Forwell.*

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2300. Anonymous. **Protecting tender plants over winter.** Gard. Chron. Amer. 23: 21. 1919.

2301. Anonymous (J. K. R.) [Rev. of: Bailey, L. H. (Editor). **Standard cyclopedia of horticulture,** vol. VI, S–Z; with Supplement. *P. 3043–3639, fig. 3516–4066.* 1919.] Jour. Botany 57: 198–200. 1919.

2302. Anonymous. **The best strawberries for different locations.** Horticulture 29: 417. 1919.

2303. Anonymous. **The Asiatic crabapples.** Gard. Chron. Amer. 23: 198. *5 fig.* 1919.

2304. Anonymous. **What of the Pacific Islands?** [Rev. of: (Anonymous?). **The Pacific Islands.** McCarron Stewart and Co.: Sydney, New South Wales, 1919.] Tropical Life 15: 66–67. 1919.—Mostly a discussion of the production of cocoanuts on these Islands.—*H. N. Vinall.*

2305. Anonymous. **Riego y fertilizacion de los arboles nuevos.** '[Irrigation and fertilization of new trees.[Informacion Agric. [Madrid] 9: 106–107. *1 fig.* 1919.—A method of applying water and fertilizer dissolved in the water through a tube and funnel to newly planted trees to avoid waste and loss by surface evaporation.—*John A. Stevenson.*

2306. Anonymous. **California Date Association builds packing house at Coachella.** California Citrograph 4: 348. *1 fig.* 1919.—A detailed description with illustration is given of a new and modern packing house erected by the Date Growers Association for the purpose of handling the rapidly increasing date crop of the Coachella Valley.—*J. E. Coit.*

2307. Anonymous. **Further study needed on time for picking frozen lemons.** California Citrograph 4: 140. 1919.—It is pointed out that tests of lemons to determine the composition of sound and frozen lemons with special reference to the effect of slow thawing on frozen lemons conducted by H. S. Bailey and C. P. Wilson, and published on by them in Journal of Industrial and Chemical Engineering, show results different from those of Young and Thomas. Their tables show that the specific gravity of stored frozen lemons is much closer to normal fruit than it is to the frozen fruit remaining on the tree. The entire difference may possibly be accounted for in the fact that the fruit which Bailey and Wilson used in their tests was picked January 7, beginning about daylight and immediately after the freeze, while the fruit used by Young and Thomas was picked January 13 after the freeze which came on the night of January 6.—*J. E. Coit.*

2308. ANONYMOUS. **Pomona growers ask relief from court on heating law.** California Citrograph 4: 325, 326. 1919.—In order to test the constitutionality of the anti-orchard-heating ordinance which was adopted at a referendum election in Pomona, California in April, 1919, an application has been made for an injunction to restrain the Mayor and Chief of Police from enforcing its provisions. [Note. The corporate limits of the City of Pomona include 8700 acres of orange and lemon groves, much of which is under the jurisdiction of the Pomona Valley Orchard Protective Association.]—*J. E. Coit.*

2309. AUDAS, J. W. **The litchi.** Jour. Dept. Agric. Victoria 17: 371–373. *Pl. 1.* 1919. —The litchi (*Nephelium Litchi*) is described as an evergreen growing from 15 to 20 feet high and bearing a delicious fruit. There are 13 species native in Australia. Its propagation is discussed.—*J. J. Skinner.*

2310. BARSS, H. P. **Some prune troubles of non-parasitic nature.** Proc. Oregon Hortic. Soc. 1918: 52–58. 1919.—This paper was printed in Better Fruit 13¹: 7–8, 24–26 (1919), under the title "Prune troubles of non-parasitic nature."

2311. BEAN, W. J. **Malus rivularis.** Curtis Bot. Mag. 15: *Pl. 8798 (colored).* 1919.—One of the crab apples native of western North America where it is the only species. Fruits are ellipsoid, yellowish tinged with pink or green, and without the calyx lobes at the apex.—*Oliver A. Farwell.*

2312. BONNIER, GASTON. [Rev. of: RUBY, JOSEPH. **Recherches morphologiques et biologiques sur l'olivier.** (Morphological and biological studies on the olive.) *400 p. 16 fig.*] Compt. Rend. Acad. Agric. France 5: 307–308. 1919.—A careful study of the external characters and anatomy of the various parts of the olive tree, as well as the development, flowering, fruiting, and various physiological functions. Analyses are given of the oil and ash content of fruits from various sources and of the ash content of the different parts of the plant, especially with relation to the different varieties and their variation under different conditions. This is followed by a monograph of the known varieties of olives.—*E. A. Bessey.*

2313. BLAIR, W. SAXBY. **Dusting fruit trees for insects and disease.** Agric. Gaz. Canada 6: 16–18. 1919.—See Bot. Absts. 3, Entry 2572.

2314. BOON, C. L. **Restoring an old orchard.** Gard. Chron. Amer. 23: 42–43. 1919.

2315. BOWLES, E. A. **The effect of the frosts of the winter of 1916–17 on vegetation.** Jour. Roy. Hortic. Soc. 43: 388–461. 1919.—The winter of 1916–17 was most severe of any since 1894–5 and the author presents a discussion of the characteristics of the winter and a long list of plants, giving the degree of injury if any, at various places in Great Britain and Ireland. The information was collected by means of questionnaires and an outline of conditions at each of some 70 points of observation is given.—*J. K. Shaw.*

2316. BROWN, G. G. **Fertilizer tests for strawberries.** Oregon Agric. Exp. Sta. Bull. 159. *15 p., 2 fig.* 1919.—See Bot. Absts. 3, Entry 1782.

2317. BROWN, GORDON G. **Hood River strawberry fertilizer tests.** Better Fruit 13¹: 14–16, 33–34. March, 1919.—Nitrate of soda, superphosphate, and sulphate of potash were tested as fertilizers for strawberries during the seasons 1916, 1917 and 1918. A fair average increase in yields was obtained from plots on which nitrate of soda was applied either (1) during blossoming time or (2) twice, early in the spring and at blossoming time. The value of leguminous cover crops, especially clover, is also emphasized. A table of results is appended.—*A. E. Murneek.*

2318. BROWN, GORDON G. **Experiments with nitrate of soda as a fertilizer for orchards in the Hood River Valley, Oregon.** Proc. Oregon Hortic. Soc. 1918: 107–112. 1919.—This is a review of recent observations by the author respecting the value of nitrate of soda as a fertili-

zer for apples in the Hood River valley. Two successive annual applications of 5 to 6 pounds of nitrate of soda per tree in early March resulted in increase in vigor of trees, as expressed by terminal growth and leaf development. Percentage of fruit set doubled and trebled in many instances. Further applications were not proportionately successful, thus bringing to the forefront considerations of the many factors influencing growth and productivity of the trees. Consideration is given to the effects of soil culture, irrigation, cover crops and fertilizers upon the blooming habit and yields of apples. No definite conclusions are drawn by the author.—*A. E. Murneek.*

2319. Chace, E. M. **The detection and elimination of frosted fruit.** California Citrograph 4: 108, 109, 144. *5 fig.* 1919.—There are at least three different methods of determining the extent of frost damage to oranges. 1. Estimating the damage by surface indications (not dependable); 2, the hesperidin crystal test (very accurate but hardly suited for commercial work); 3, specific gravity test. This last is the one in most common use. Description is given of the water separator specific gravity machine used in most packing houses for segregating fruit frozen in different degrees. Tables are presented giving data on a series of tests of these machines as operated in many packing houses. It is pointed out that some frozen oranges are heavier than some sound oranges and this troublesome variation operates against the accuracy of any device which is based on specific gravity The conclusions are that if all frozen oranges were lighter than all sound oranges and the machine properly operated, 85 per cent efficiency would be shown, whereas with fruit as it is the average efficiency of 5 machines was 74 per cent.—*J. E. Coit.*

2320. Charmeaux, François. **L' ensachage du raisin de table, son origine, ses raisons, ses résultats.** [The bagging of grapes, its origin, reasons and results.] Jour. Soc. Nation. Hortic. IV, 20: 52–56, 75–79. March and April, 1919.—The author gives his experience and reviews the work of numerous French viticulturists and investigators on bagging table grapes, and compares the results with spraying. His conclusions are that sprays should not be used for table grapes and that the only practical method of protecting the fruit from diseases and insects is to bag the bunches of grapes. No definite reason is given for not using sprays except that discriminating buyers do not buy grapes that have been sprayed. Paper covering is claimed to protect the grapes against injury by birds. Results of use of paper of various colors also given.—*H. C. Thompson.*

2321. Childs, Leroy. **Some comparative results in controlling codling moth and apple scab with dust, spray gun and rod.** Proc. Oregon Hortic. Soc. 1918: 112–118. 1919.—See next following Entry, 2322; also Bot. Absts. 3, Entry 2599.

2322. Childs, Leroy. **Comparativa results in controling codling moth.** Better Fruit 13[1]: 5, 41–46. March, 1919.—See Bot. Absts. 3, Entries 2321, 2599.

2323. Conrit, I. J. **Proper maturing of avocados.** Ann. Rept. California Avocado Assoc. 1918–1919: 78–83.—The concensus of opinion is overwhelmingly in favor of some kind of maturity standard for avocados. Analyses of the fruit show that the oil increases with ripening, but the correlation between the percentage of oil and the best edible quality has not been determined. Continued sale of immature windfalls is likely to injure the market. Sketches are given of the present legal maturity standards for oranges, grapes, olives, and cantaloupes. It is concluded that on account of the peculiar nature of the avocado, being a salad fruit, none of these maturity standards would be advisable. It is suggested that inasmuch as varieties have already been classified according to season, that the committee on classification and registration of varieties be authorized by the directors to submit recommendations as to the earliest dates at which the fruit of all commercial varieties can be considered properly mature. Members of the association may be asked to sign an agreement not to pick and ship the fruit of any commercial variety before the maturity date specified for that variety. The containers could then be plainly labeled "Mature Avocados, Guaranteed by the California Avocado Association."—*J. E. Coit.*

2324. COONS, G. H. **Bordeaux mixture.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 18–19. *6 fig.* Aug., 1919.

2325. CORDLEY, A. B. **Possible causes of "sour sap" in the Pacific Northwest.** Better Fruit 13[11]: 6, 30–32. May, 1919.—Pathological condition of fruit trees, locally known as "winter kill," "sour sap," or "spring injury" occurs in most of the humid sections of the Pacific Northwest. The greatest injury takes place from a short time before the opening of blossoms to three or four weeks after. The symptoms are: discoloration of cambium, withering of leaves, followed by dying of branches or of the whole tree. The writer advances a theory: "Spring injury ("sour sap") is due to acute nitrogen starvation during the most active vegetative period in the life of the tree." Lack of nitrogen in the tree is attributed to leaching of nitrates from the soil and to inhibition of the processes of nitrification. Discussion in support of the theory follows. Remedies suggested are: (1) proper cultivation of the soil to facilitate nitrification or (2) a light application of nitrate of soda shortly before blossoming time.—*A. E. Murneek.*

2326. CURTIS, R. H. **Report on meteorological observations at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 316–330. 1919.—The fourteenth annual report of meteorological observation at the observatory of the Society. Air and soil temperatures, humidity, rainfall, wind and sunshine records for each month in the year are given.—*J. K. Shaw.*

2327. DEONG, E. R. **Effect of excessive sterilization measures on the germination of seeds.** Jour. Econ. Entomol. 12: 343–345. 1919.—See Bot. Abstr. 3, Entry 2913.

2328. DOMINGO, M. GIL. **El empleo de abonas quimicas en los naranjas.** [Chemical fertilizer for oranges.] Informacion Agric. [Madrid] 9: 60,–61. 1919.—The use of sodium nitrate recommended at the rate of 1–2 kgm. per tree in two or three applications at 20–30 day intervals.—*John A. Stevenson.*

2329. DOSCH, HENRY E. **History and development of French walnuts in Oregon.** Proc. Oregon Hortic. Soc. 1918: 67–72. 1919.—A brief account of the history and development of the walnut industry in Oregon. Popular varieties of walnuts now grown in the state are discussed and described in detail.—*A. E. Murneek.*

2330. DURHAM, HERBERT E. **The Lorette system of pruning.** Jour. Roy. Hortic. Soc. 43: 261–277. *Fig. 38–44.* 1919.—The method of LORETTE for summer pruning apple, pear and other fruit trees is discussed on the basis of observation in the orchard of the originator near Douai, France and from 4 years' experience of the author. The purpose of the method, which is carried out from May to September, is to evoke growth from dormant eyes and to induce increased fruit-bearing near the supporting stems. By cutting back shoots at the proper stage of growth, the formation of fruit spurs is favored and increased production is secured. There is a brief discussion of the nomenclature of fruit-tree parts and a short bibliography.—*J. K. Shaw.*

2331. EUSTACE, H. J. **Horticultural notes.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 133. Feb., 1919.—Contains a note on fake tree doctoring by special powders placed in a hole bored in the tree.—*E. A. Bessey.*

2332. EUSTACE, H. J., AND R. H. PETTIT. **Spray and practice outline for fruit growers.** Michigan Agric. Exp. Sta. Special Bull. 93. *32 p., 6 fig.* 1919.—A discussion of the sprays to be used for controlling the insects and fungi of fruits in Michigan, method of preparation, time and manner of application, etc.—*E. A. Bessey.*

2333. GINARTE, BENJAMIN MUÑOZ. **Consideraciones sobre el cultivo de la Piña en Cuba.** [Cultivation of the pineapple in Cuba.] Revist. Agric. Com. y Trab. 2: 335–341. *7 fig.* 1919. —Historical and descriptive article. [See next following Entry, 2334.]—*F. M. Blodgett.*

2334. Ginaate, Benjamin Muñoz. **Consideraciones sobre el cultivo de la Piña en Cuba.** [Cultivation of the pineapple in Cuba.] Revist. Agric. Com. y Trab. 2: 370–377. *Fig. 8–13.* 1919.—Continuing from a previous article [See next preceding Entry, 2333.], planting, cultivating, fertilizing, harvesting, packing and the expenses and receipts of growing pineapples are discussed.—*F. M. Blodgett.*

2335. Jensen, C. A. **Some relations between citrus fruit growth and soil moisture and climatic conditions.** California Citrograph 4: 119, 131. 1919.—A report of investigations carried on at Exeter, Riverside, and Chula Vista, California and at Phoenix, Arizona to determine the effect, in the case of light soils, of more frequent irrigations on the rate of growth in volume of lemons. Irrigations with smaller amounts of water at more frequent intervals resulted in an increase in rate of growth from 18 to 27 per cent. In another experiment where the increase in frequency of irrigation applied to the first part of the season only, those with the frequent irrigation reached picking size from 24 to 30 days earlier. The data are presented by means of four graphs. It is emphasized that such differences in growth rates may not be expected on the heavier soil types or near the coast where the transpiration rates are much lower. [See also next following Entry, 2336.]—*J. E. Coit.*

2336. Jensen, C. A. **Some relations between citrus fruit growth and soil moisture and climatic conditions. Paper No. 2.** California Citrograph 4: 184, 188. 1919.—Reasoning from data presented in a previous paper the author suggests that it might be more practicable for fruit growers to determine when to irrigate by taking measurements of the rate of growth of lemons rather than by soil moisture tests. The reliability of such a method was investigated and 2 graphs are presented to show by correlation coefficients that the amount of available soil moisture is not the only factor affecting growth. Air humidity and temperature are also important factors. Hence the rate of growth of lemons may be used only as an approximate indicator of the soil moisture needs of the trees. [See also next preceding Entry, 2335.]—*J. E. Coit.*

2337. Kenhardt, Adolf. **The cultivation of the custard apple.** South African Fruit Growsr 6: 203. *2 fig.* 1919.

2338. Kinman, C. F. **Observation on frost injury to avocados.** Ann. Rept. California Avocado Assoc. 1918–1919: 56–58.—Great variation in susceptibility to frost injury noted. In general, most healthy and vigorous trees showed least frost damage. Some varieties of the Mexican type withstood the cold remarkably well, even those trees growing at different points in the Sacramento and Santa Clara valleys. Among varieties especially recommended the Fuerte withstood the cold much better than the others. It is pointed out that all kinds are more or less tender while quite young. The degree of hardiness of a new variety cannot be accurately judged until after the tree has come into bearing.—*J. E. Coit.*

2339. Knight, E. E. **Why are the Guatamalan avocados best?** Ann. Rept. California Avocado Assoc. 1918–1919: 31–33. *1 fig.*—Committee on varieties has selected 8 out of a total of 158 varieties for recommendation. It is believed that all of these may be displaced with still better varieties when a larger number of the selections introduced from Guatemala will have fruited. Free hand drawing giving approximately the elevation of tablelands from the Rio Grande to the equator. Proceeding southward, no superior avocados are found south of Guatemala until Columbia is reached. Author agrees with Popenoe's estimate of Guatemalan varieties and considers them best because: "The flesh is of a deeper yellow color, smoother, more buttery texture, and richer flavor than any varieties yet known in the United States."—*J. E. Coit.*

2340. Lefferts, D. C. **Can mulching be recommended as a citrus grove method?** California Citrograph 4: 160, 161, 163. 1919.—On a very stiff red clay orchard soil which had gotten into bad physical condition the author tried a heavy mulch applied in basins including somewhat more space than the drip of large orange trees. This system was practised for 5

years with the result of larger crops with less water used but smaller sized fruit. This system largely restricted the roots to the moist mulched area. At the end of 5 years when the cost of mulching material became prohibitive a return was made to the flat system, after which the condition of the grove was much improved over what it had ever been, showing the value of the humus resulting from the mulch. No commercial fertilizer or manure was added during all the experiment. The author concludes that the experiment has improved his soil conditions very much. At the same time he has produced larger crops and more cheaply than has been the case on adjoining groves of similar soil type.—*J. E. Coit.*

2341. LEWIS, C. I. **Correlation of orchard practices.** Better Fruit 13⁹: *Tab. 1–8.* March, 1919.—The interrelation of pruning, tillage, fertilizing and intercropping on the vigor and productivity of fruit trees is given attention in this discussion. The effects of application of nitrate of soda on the increase in yields of apple trees is considered in detail. A summary of experimental results of fertilizer tests conducted by the Hood River and Southern Oregon Experiment Stations is given in tabular form. The following conclusions are drawn by the author: 1. An application of five pounds of nitrate of soda per tree will restore devitalized trees.—2. For best results, nitrate should be applied about a month before blossoming time. —3. The benefits of nitrate application extend over two seasons and are shown in: (a) Dark green foliage, (b) Better wood growth, (c) Improved set, (d) Increased yield, (e) Larger specimens of fruit.—*A. E. Murneek.*

2342. LEWIS, C. I. **Deterioration of fruit at picking time.** Proc. Oregon Hortic. Soc. 1918: 45–49. 1919.—This paper was printed in Better Fruit 13⁷: 5 7. 1919., under the title "Premature deterioration of fruit."

2343. LOREE, R. E. **The culture of currants and gooseberries.** Michigan Agric. Exp. Sta. Circ. 38. *18 p., 9 fig.* 1919.—A popular account of currant and gooseberry culture. —*E. A Bessey.*

2344. MACKIE, D. B. **Navel satsumas found in California.** California Citrograph 4: 60, *1 fig.* 1919.—Previous publication of the observations of Prof. Kukuchi of the Kanagawa Experiment Station, Yokahama, Japan on the appearance by mutation of a navel form of the satsuma (onshiu) orange has brought the information from A. C. Masteller of Oroville, California that certain of his satsuma orange trees possessed branches which bore this navel form. A photograph is included of specimens submitted. [See Bot. Abstr. 3, Entry 2104.]—*J. E. Coit.*

2345. MATTHEWS, C. D **Report of the division of horticulture.** North Carolina Agric. Exp. Sta. Ann. Rept. 41: 50–55. [1919.]—This is a brief report on pecan investigations, investigations with peaches, investigational work with thermal zones, variety work in pomology, native fruits of North Carolina, investigations with strawberries, the coöperative rotundifolia vineyard, investigational work with sweet potatoes, investigations with Irish potatoes, and testing South American varieties of potatoes.—*R. A. Jehle.*

2346. MCBETH, I. G., AND J. R. ALLISON. **Recent investigations in orchard heating.** California Citrograph 4: 51, 65, 67. *5 fig.* 1919.—Observations made on small lemons after cold nights indicated that the damage to fruits subjected to a given temperature for a given length of time was by no means constant. Experimental results indicated that humidity was an important factor. Series of experiments were performed on lemons *in situ* by using a specially devised freezing chamber containing coils of copper tubing into which was admitted liquid CO_2. The humidity was regulated by passing the air used for ventilating through sulfuric acid or water as desired. The chamber contained thermometers and hygrometer which were read through a double glass window. Graphs are presented giving results in saturated air and in 40 per cent humidity. The time required for damage to young lemons after a temperature of 29°F. is reached is one hour, as against 30 minutes in a saturated atmosphere. The damage to the surface of the rind of the lemon is also greater in the wet condition than in the dry, showing the greater severity of freezing. Two photographs show details of the apparatus and cart for transporting it.—*J. E. Coit.*

2347. McBeth, I. G., and J. R. Allison. **Necessity for manure standardization.** California Citrograph 4: 259, 278. *2 fig.* 1919.—The problem of maintaining the organic content of citrus lands would seem to be one of the biggest problems confronting the Southern California citrus industry of today. The tremendous demand for manure combined with the limited supply has led to excessive prices on one hand and adulteration with sand, dirt, water, etc. on the other. An analytical study was made of 76 carloads bought by the Leffingwell Rancho at Whittier. The results presented in a series of graphs show that there is little correlation between cost and value. As a result of these studies the authors suggest the following method of evaluating manures in southern California, where the phosphorus and potassium content is commonly ignored. It is believed that $4 a unit for nitrogen and 5 cents a unit for organic matter is sufficiently high to cover the full value of the product to the grower, delivered at his nearest station.—*J. E. Coit.*

2348. McClelland, T. B. **Terrenos productivos e improductivos de café.** [Profitable and unprofitable coffee lands.] Porto Rico Agric. Exp. Sta. Bull. 21. *16 p. Pl. 1–2, 5 fig.* Span. Ed. 1919. [Eng. Ed. 1917.]—The hills met with in the district extending from the west coast of Porto Rico well back into the interior, produce vigorous coffee trees on the lower slopes, but near the top the trees are of poor growth with low yields. Studies were made to find the cause of this condition. It was found that liming the soil was without benefit, that the moisture content was not a contributing factor, since 0.3 per cent was the average difference in moisture content of soils from the upper and lower slopes, and finally frequent cultivation combined with application of animal manure failed to produce proper growth on the upper slopes. It appeared that the condition was due to washing away of the soil from above which is deposited on the lower slopes. The poorer areas should be devoted to forest or pasture, or if coffee is to be planted large holes should be prepared and filled with organic matter.—*John A. Stevenson.*

2349. Miller, C. C. **Injurious lemon roots.** California Citrograph 4: 356, 359. *2 fig.* 1919.—It is the custom in California to grow the lemon on sour orange stock. Frequently the lemon bud is placed too low, and after the soil accumulates above the bud union, some lemon roots will put out. Wherever this has occurred the tree deteriorates. It appears that the lemon root actually injures the tree causing the branches just above such a root to show yellow leaves. When the lemon root is cut off the tree quickly recovers.—*J. E. Coit.*

2350. Mitra, M. **Discussion of winter pruning vs. summer pruning.** Better Fruit 13[11]: 8, 26. May, 1919.—In reply to an article in Better Fruit by C. I. Lewis, the writer discusses the relation of stored carbohydrates, particularly starch, to summer and winter pruning of fruit trees. Investigations with seedlings and large bearing trees have shown the disappearance of starch from spurs and branches during the dormant season (November to March), while an abundance of starch was found at this time in the main stem and roots. Beginning with the growing season starch appeared again in spurs and branches and was particularly plentiful around the "plant organs." Because of this cyclic movement of starch, it is pointed out that pruning should be done as much as possible during the dormant period of the tree and the least in summer time, thus saving the tree from an excessive loss of carbohydrates.—*A. E. Murneek.*

2351. Newell, Wilmon. **Citrus canker eradication in the State of Florida.** California Citrograph 4: 313, 323, 1919.—See Bot. Absts. 3, Entry 2713.

2352. Pandock, E. H. **Bridge grafting on citrus trees.** California Citrograph 4: 276, 277. *3 fig.* 1919.—Citrus trees when girdled and ruined by gum disease or pocket gophers may be saved by ordinary bridge grafting. As a result of experiments it was shown that it was more economical to save a tree by bridge grafting with sour orange wood bridges than to remove the tree and grow a new one in its place. Standard bridge grafts resulted in a quicker recovery than when sour orange seedlings were planted around the base of the injured tree and their tops grafted into the trunk above the girdled area.—*J. E. Coit.*

2353. PERCY, EARL. The productive mortality of prunes. Better Fruit 13⁸: 9–10, 38–40. March, 1919.—This is a general discussion of factors causing decline in productivity of plum (prune) trees. Particular attention is paid to heart rot, root borers, general care of the trees and cultural practices, either of which may be instrumental in causing premature reduction of vitality and fruit bearing capacity of a tree. Based on statistical evidence, comparative yields of young and old trees in two counties of Oregon are given.—*A. E. Murneek.*

2354. PERCY, EARL. Filbert culture a new orchard industry in Oregon. Better Fruit 13⁸: 7–8. June, 1919.—A brief discussion of the history, present status, and future possibilities of growing filberts in Oregon.—*A. E. Murneek.*

2355. PEROLD, A. I. The Union's viticulture industry. South African Jour. Indust. 2: 318–326. 1919.

2356. PILLSBURY, J. P. Report of the division of horticulture. North Carolina Agric. Exp. Sta. Ann. Rept. 41: 56–57. [1919.]—This is a brief report of experiments with hybridization of *V. rotundifolia* with other species of *Vitis*, and investigations as to the best stocks and methods of propagation for English walnuts in the south, together with a study of walnut-hickory hybrids, investigation to determine the means of improvement of certain plum varieties, and hybridization of bramble fruits to determine varieties of raspberries suitable for the south.—*R. A. Jehle.*

2357. POPENOE, WILSON. The avocados of Mexico: A preliminary report. Ann. Rept. California Avocado Assoc. 1918–1919: 58–74. *Pl. 5–13.*—Mexico, on account of its great size and almost endless series of environmental conditions offers the greatest opportunities for avocado investigations. This paper is a report upon the first 6 months' work, the author having previously spent 16 months in Guatemala engaged in similar studies. Four chief races of avocadoes recognized, all found in Mexico. The West Indian race seems to be the true *Persea americana* of Miller, formerly known as *Persea gratissima* of Gaertner. Not yet found in an indigenous state. The Guatemalan race is also probably *Persea americana* though this is not considered as proved till indigenous trees are found. The Mexican race occurs abundantly in an indigenous state and as it appears quite distinct will probably be shown to belong to the species *Persea drimyfolia* as established in 1831 by Chamisso and Schlechtendahl. The Chinini race is suggested to include certain forms in southern Veracruz which will probably be referred to *Persea schiedeana* of Nees, reduced by Meissner in 1864 to the rank of a botanical variety of *P. americana*.

The West Indian race is adapted to lowlands near the sea while both Mexican and Guatemalan races thrive best on inland tablelands at elevations of 4000 to 6000 feet. Evidence accumulates that avocados prefer heavy clay soils. Until very recently all commercial plantations in Mexico were composed of seedlings. In productiveness the races rank as follows: Guatemalan, Mexican, West Indian, and Chinini. The Mexican race does not fully deserve the condemnation it has received in California. After visiting Atlixco in order to examine parent trees and settle a much discussed point in regard to the true classification of the Fuerte and Puebla varieties, the author concludes that Puebla is a true Mexican while Fuerte is probably a hybrid, not representative of any group but appears to be *sui generis*.—*J. E. Coit.*

2358. POPENOE, WILSON. Agricultural explorations in Mexico. California Citrograph 4: 63–71, 73. *4 fig.* 1919.—This is paper No. 3 from the Journal of Wilson Popenoe, Agricultural Explorer for the University of California. Descriptions of tropical fruits studied at Oaxaca, June 21–24; Tapachula, June 27–July 3; La Tacualpa, July 4–8; and Puerto Mexico, July 14, 1918. The following are included: The Hicaco, *chrysobalamus icaco;* Chicozapote, *Achras zapota;* Guanabana, *Annona muricata;* Papauce, *Annona diversifolia* (illustrated); Anona, *Annona squamosa; A. purpurea; A. reticulata;* Papaya, *Carica papaya;* Avocado, *Persea americana* (ill.); Pacaya, *Chamaldorea Sp.;* Jacote Maranon; *Anacardium occidentale;* Tamarindo, *Tamarindus indica;* Mango, *Mangifera indica;* Nance, *Brysonima crassifolia;*

Patashte, *Theobroma bicolor;* Pomegranate, *Punica granatum;* Cainito, *Chrysophyllum cainito;* Guava, *Psidium friedrichsthalianum;* Guayaba, *Psidium guajava;* Roseapple, *Eugenia jambos;* Pineapple, *Ananas sativus;* Toronja, *Citrus sp.;* Limoncillo, *Rheedia Sp.* Especial emphasis is placed on the possible value of the papauee.—*J. E. Coit.*

2359. Preizer, J. A. **Fertilization of citrus groves during period of high priced fertilizers.** California Citrograph 4: 231, 255. *1 fig.* 1919.—In March, 1919, the delivered cost per unit of nitrogen varied in the different fertilizing material from $5.60 in ammonium sulfate to $17.33 in steamed bone. At the same time loose alfalfa hay could be bought at a price to yield nitrogen at $6.40 per unit. Inasmuch as alfalfa hay possesses aside from its nitrogen content a great value on account of its humus producing power, it is suggested that citrus growers should make a still greater use of alfalfa hay for fertilizing purposes.—*J. E. Coit.*

2360. Reed, H. S. **Certain relationships between the flowers and fruits of the lemon.** Jour. Agric. Res. 17: 153–165. 1919.—The quantitative records obtained during two years study of the vegetative and fruiting cycles of seven bearing Lisbon lemon trees, growing in a commercial orchard in southern California are used as a basis for discussing (a) the seasonal distribution of fruit buds; (b) the size and productiveness of inflorescences; (c) the time required for growth of fruit and the relations of this time to the season at which the buds appear; (d) the numerical ratio of flower buds to mature fruit.—About 66 per cent of the 4545 "new buds" studied were produced in March and April; 13 per cent in November; 17 per cent between April and November and 3 per cent during winter. The number of flowers per inflorescence varied from 1 to 28. A bud on one of the many few-flowered inflorescences had a greater chance of forming a fruit than one on the few many-flowered inflorescences. Of the 4440 buds observed, 6.62 per cent produced mature fruit after 7 to 14 months. Fruit set in spring had the best chance for survival, and that set in May, June, and July required the shortest average time to attain maturity.—*A. J. Heinecke.*

2361. Reimer, F. C. **A new and effective disinfectant for pear blight.** Better Fruit 13[10]: 24–27. Apr., 1919.—See Bot. Absts. 2, Entry 535; 3, Entry 2736.

2362. Sallmon, W. H. **The California Avocado Association: Its history and progress. President's Address.** Ann. Rept. California Avocado Assoc. 1918–1919: 44–50.—A review of the origin and activities of the Association from its inception down to date.—*J. E. Coit.*

2363. Scott, L. B. **Varieties of the Satsuma orange.** California Citrograph 4: 176, 199. *4 fig.* 1919.—Recent investigations in the United States and Japan have shown that the old variety name Satsuma really includes a group of varieties which differ in shape, season, and other important characters. The indiscriminate mixing of these forms is the cause of lack of uniformity in Satsuma shipments which has been objected to by the trade. Three of these subvarieties: the Owari, Ikedn, and Zniral have been identified in this country. Future plantings should be limited to one variety and the Owari is suggested as probably the best.—*J. E. Coit.*

2364. Seaton, Elwyn D. **Prune-tree culture in the great Pacific Northwest.** Better Fruit 13[8]: 7–9. *4 fig.* March, 1919.—In this popular article special emphasis is laid upon soil culture, proper planting of trees and the development of an extensive root system. The author is a prune grower of long experience.—*A. E. Murneek.*

2365. Shamel, A. D. **Further observations upon the application of manure in citrus orchards with the furrow manure system.** California Citrograph. 4: 332, 333. *8 fig.* 1919.—Popular.

2366. Shephera, W. P. **Packing house of Anaheim Orange and Lemon Association.** California Citrograph. 4: 300–301, 326. *2 fig.* 1919.—Detailed description with illustrations of a large, fully equipped, modern orange and lemon packing-house in southern California.—*J. E. Coit.*

2367. SHEWARD, T. **Growing and pruning berry fruits.** Gard. Chron. Amer. 23: 304. *1 fig.* 1919.

2368. SHEWARD, T. **How varieties of fruit and flowers are originated.** Gard. Chron. Amer. 23: 118. *1 fig.* 1919.—See Bot. Abstr. 3, Entry 2197.

2369. SHEWARD, T. **How to thin fruit.** Gard. Chron. Amer. 23: 199. *1 fig.*, 1919.

2370. SHEWARD, T. **Summer pruning of trained fruit trees.** Gard. Chron. Amer. 23: 240. *1 fig.* 1919.

2371. SMITH, ARTHUR. **Planting fruit trees in the garden.** Gard. Chron. Amer. 23: 84–86. *4 fig.* 1919.

2372. SOULIER-VALBERT, F. **The coconut world.** Tropical Life 15: 55. 1919.—The author claims the great consumption of margarine has made the coco-nut palm the most important food producer in the fruit kingdom. The cost of putting out a plantation of 50,000 trees is estimated $125,000. At the beginning of the seventh year the revenue will amount to 3 shillings per tree or 20 to 25 per cent on the investment.—*H. N. Vinall.*

2373. SCHR, GORDON. **Yields of Washington navel oranges in relation to pruning.** California Citrograph 4: 290, 325. 1919.—In the case of 28-year old orange trees, not in thrifty condition a series of experiments lasting several years showed a greater production from lightly pruned than from heavily pruned trees.—*J. E. Coit.*

2374. THOMAS, E. E. **Frozen lemons and oranges for by-products.** California Citrograph 4: 78, 81, 104. *1 fig.* 1919.—An extensive investigation of the changes taking place in frozen citrus fruits. Sound and badly frozen oranges and lemons were picked every 4 days following a freeze, for a period of 2½ months, and were weighed and analyzed. These were compared with sound and frozen fruit picked immediately after the freeze and stored. Freezing kills the protoplasm changing the semi-permeable membrane to a dead porous mass, thus allowing the water of the juice to evaporate through the rind. Hence frozen fruit decreases in specific gravity. Tables are given showing results of the investigation. The actual sugars, in grams per frozen orange, decreased (probably from fermentation) from 6.5 grams to less than 2 grams. Acid also decreases in frozen fruit. Badly frozen fruit should be picked at once and sent to by-products factory. To determine the amount of injury; fruit should be picked and stored in a warm room. The sound fruit will increase in specific gravity by drying out of the rind and loss of volume with little loss of pulp juices. On the other hand frozen fruit decreases rapidly in specific gravity as the pulp juices are lost by permeating and evaporating through the rind. In from 4 to 6 days under these conditions the specific gravity test will reveal the extent of the damage.—*J. E. Coit.*

2375. TUERO, F. LOPEZ. **Vainilla.** [Vanilla.] Informacion Agric. [Madrid] 9: 79–82, 101–104, 123–127. 1919.—An extensive compilation covering a description of the various organs of the plant, floral structure, botanical classification, and history of the cultivation of the plant from the time it was first carried to France in 1793. Cultivation methods are considered and in particular the making of nurseries, methods of providing shade, and the proper way to prune. The very vital matter of artificial hand pollination is described. Finally there is discussed the picking of the beans, the various ways of curing them both natural and artificial, and the system of grading the final product. The estimated expenses and yield per hectare are outlined as well as a brief account of the composition of the vanilla bean.—*John A. Stevenson.*

2376. WALLSCHLAEGER, F. O. **Citrus production in the United States and competing countries.** California Citrograph 4: 150, 172. 1919.—The United States leads in the production of citrus fruits, a normal crop being about 80,000 carloads. Spain comes next, with 68,000; and Italy, with 58,000 carloads. The author discusses imports and exports by the

various countries and gives a table showing the United States orange and grapefruit supply. In a review of the effect of the war on citrus production in the different countries, it is noted that Palestine has been particularly hard hit, Liverpool receipts of Jaffa oranges dropping from 1,000,000 cases a year to nothing.—*J. E. Coit.*

2377. Webber, H. J., and others. A study of the effects of freezes on citrus in California. California, Agric. Exp. Sta. Bull. 304: 245–321. *22 fig.* 1919.—An extended discussion is given of the effects produced on different varieties and species of citrus trees by the freezing temperatures occurring in California in January, 1913. The composition of the fruits of orange trees (*Citrus aurantium*) and lemon trees (*Citrus limonia*) gradually changes following exposure to freezing temperature. The specific gravity of the juice and the content of sucrose and invert sugar gradually decrease, but the ratio of sucrose to invert sugar does not change. The per cent of acid in the juice decreases slightly as a result of freezing, while the absolute amounts of acid present continues to decrease until practically none remains. Excessive loss of moisture from frozen citrus fruits takes place due to the loss of semi-permeability of the external cells. Partially frozen citrus fruits left on the tree continue to increase in size due to thickening of the rind, but the content of sugars and acid gradually decrease for several weeks.—*W. P. Kelley.*

2378. Winston, J. R., and H. R. Fulton. The field testing of copper-spray coatings on foliage. Better Fruit 13[11]: 9, 27–28. June, 1919.—See Bot. Absts. 3, Entry 2786.

2379. Woonbridge, T. R. Co-operation applied to orchard operation. California Citrograph 4: 116, 142. 1919.—Description of the Liberty Groves Operating Corporation, which is non-stock, based on the membership plan and operated without profit. The corporation owns tools, live stock and all equipment such as tractors, etc., which are necessary and provides labor and supervision for all ordinary citrus orchard operations such as plowing, cultivating, irrigating, spreading manure, hauling, pruning, etc., except packing and selling. The corporation is financed through a revolving fund secured by assessment. Members may resign at any time and receive their unused assessments back in full.—*J. E. Coit.*

2380. Wurth, Th. De schade aangericht door de Kloetuitbareting op de koffie-en Rubberlanden van den Kloet. [Damage to coffee and rubber by the Kloet eruption.] Proefsta. Malang [Java] Circ. 7. *3 p.* 1919.—See Bot. Absts. 3, Entry 2789.

VEGETABLE CULTURE

2381. Anonymous. Summer sown beets at Wisley, 1917–18. Jour. Roy. Hortic. Soc. 43: 495–497. 1919.—A report of the trial of 81 stocks of beet sown July 11, 1917. A list of the varieties and brief descriptions of each are given.—*J. K. Shaw.*

2382. Anonymous. Spring sown beets at Wisley, 1917. Jour. Roy. Hortic. Soc. 43: 488–494. 1919.—A report of the trial of 73 stocks of beet. A list of the varieties, brief descriptions and the awards of the committee are given.—*J. K. Shaw.*

2383. Anonymous. Mid-season peas tried at Wisley, 1916. Jour. Roy. Hortic. Soc. 43: 498–515. 1919.—A report of the trial of 121 stocks of peas sown March 31, 1916. A list of varieties, descriptions and notes, also the awards of the committee are given.—*J. K. Shaw.*

2384. Anonymous. Late peas at Wisley, 1917. Jour. Roy. Hortic. Soc. 43: 516–520. 1919.—A report of the trial of 58 stocks of peas sown at Wisley, England May 5, 1917. A list of the varieties, brief description and the awards of the committee are given.—*J. K. Shaw.*

2385. Bouquet, A. G. B. Pollination of tomatoes. Oregon Agric. Exp. Sta. Bull. 158. *39 p. 5 fig.* 1919.—Experiments extending through a period of six years on the pollination of tomatoes grown in greenhouses have shown that it is possible greatly to increase the yield

of fruits, earliness of fruiting, and the net profits from the crop. The emasculation method of pollinating the blossoms is especially recommended because of the ease of applying pollen, the prevention of the duplication of work and the thoroughness of pollen application at a time when the flower is most receptive. The work should be done carefully and regularly. Fruits from hand pollinated plants were harvested 21 days in advance of those not so treated. The number of unfruitful blossoms was reduced from 66 per cent to 20 per cent through efficient pollination. The net financial returns are decidedly in favor of hand pollination, since the cost of pollination for the entire season may be covered by increased yields during the first two weeks of harvesting, when higher prices for fruit prevail. [See Bot. Abstr. 3, Entry 2091.]—*E. J. Kraus.*

2386. CALVINO, MARIO. La mejor verdura del tropico, la chaya (Jatropha urens, var. inermis). [The best greens of the tropics.] Revist. Agric. Com. y Trab. 2: 364–365. *1 fig.* 1919.—The leaves of the "chaya" are said to be an excellent food cooked as greens or in various mixtures. The fresh leaves contain about 1 per cent of protein, 0.25 per cent of fat and 20 per cent of carbohydrates. The plant is grown from cuttings.—*F. M. Blodgett.*

2387. GUZMANES, ANTONIO. El abono del pimiento. [Fertilization of the pepper.] Informacion Agric. [Madrid] 9: 191–192. 1919.—See Bot. Abstr. 3, Entry 1786.

2388. HONSOLL, H. E. P Some hints on the manuring of garden crops. Jour. Roy. Hortic. Soc. 43: 346–358. 1919.

2389. OLNEY, A. J. Some experiments with tomatoes. Kentucky Agric. Exp. Sta. Bull. 218: 149–159. *5 pl., 1 fig.* Dec., 1918.—Three-year test with tomatoes gives conclusive evidence that staking and pruning reduces the yield of marketable fruit per plant but increases the yield per acre because of the greater number of plants. Tomatoes staked and pruned ripen about one week earlier than those untrained. Plants pot-grown give higher yields than those grown in flats.—*Frank T. McFarland.*

2390. POLAK'S FRUTAL WORKS. Pepermunt cultuur in Nederland. [Cultivation of peppermint in Holland.] Pharm. Weekblad. 56: 41. 1919.—See Bot. Abstr. 3, Entry 1688.

2391. WAID, C. W. Muskmelon culture in Michigan. Michigan Agric. Exp. Sta. Special Bull. 95. *15 p., 10 fig.* 1919.

HORTICULTURE-PRODUCTS

2392. ARDIS, José M. Importancia industrial de la Carica papaya (Chamburo de los brasileños; Fruta bomba en Cuba). [Industrial importance of Carica papaya.] Revist. Agric. Com. y Trab. 2: 366–369. *7 fig.* 1919.—This is a general article on the *Carica papaya* dealing with the uses of the digestent pepsin which is prepared from the juice, the propagation, planting, collecting juice, and drying of juice and preparing the product for export.—*F. M. Blodgett.*

2393. ANONYMOUS. Castor oil production. No. 1. Tropical Life 15: 6–7. 1919.—A compilation setting forth the statement from an American consular report that castor beans (*Ricinus communis*) grown in the Philippine Islands from seed imported from India have a higher oil content than seed of the local variety. Analysis of seed of the Indian variety showed 50 per cent of oil whereas seed of the native variety contained only 40 per cent. [See next following Entries, 2394, 2395.]—*H. N. Vinall.*

2394. ANONYMOUS. Castor oil production. No. 2. Tropical Life 15: 21. 1919.—A compilation of information on yields and the oil content of castor beans. In Madras where 300,000 acres are planted to castor beans (*Ricinus communis*) the normal yield is 200 to 300 pounds per acre on dry land and 700 pounds in the more favored localities. The average yield in the United States varies from 700 to 1600 pounds per acre. A higher percentage of

oil (55.2 per cent to 56.5 per cent) is found in the larger seeded types, but the oil from the smaller seeded varieties, yielding 49 per cent, is of higher quality and is used for medicinal purposes. [See next preceding and next following Entry, 2393, 2395.]—*H. N. Vinall.*

2395. Anonymous. Castor oil production. No. 3. Tropical Life 15:36–37. 1919.—A compilation concerning soils and planting practices suitable to the production of castor beans. [See next preceding Entries, 2393, 2394.]—*H. N. Vinall.*

2396. Bioletti, Frederic T., and W. V. Cruess. Grape syrup. California Agric. Exp. Sta. Bull. 303:227–242. 1919.—Methods are given for the preparation of grape syrup for table, cooking and canning uses.—*W. P. Kelley.*

2397. Cabrera, Teodoro. Tortas de carbon. Experiencia realizada en la Estacion Exp. Agronomica. [Coal briquets.] Revist. Agric. Com. y Trab. 2:386. 1919.—Commercial briquets are compared with those made with the resinous juice of *Enterolobium cyclocarpum* fruit, and the latter prove superior.—*F. M. Blodgett.*

2398. Condit, I. J., M. E. Jaffa, and F. W. Albro. The carob in California, nutritive value of the carob bean. California Agric. Exp. Sta. Bull. 309:431–452. *8 fig.* 1919.—The anatomical parts of the carob tree (*Ceratonia siliqua*) are briefly described and the soil and climatic requirements and methods of propagation discussed. Food analyses are given of the pods and seeds of the carob.—*W. P. Kelley.*

2399. Knapp, A. W. The fermentation of cacao. [Reprinted from Jour. Soc. Chem. Ind. 37:468–470. 1918.] Tropical Life 15:83–84. 1919.—A plea for the application of chemical science to cacao production. The author indicates several ways in which improvements can be made. (a) By increasing the yield per tree from the present average 1½ to 2 pounds a year to 6 pounds per tree. (b) By the development of a machine or tool for harvesting the crop. (c) By better methods of extracting the beans from the pod. (d) By the use of mechanical transport in conveying the cacao to the fermentation house. (e) By developing uniform methods and control of fermentation processes and the utilization of the juice or "sweatings" as by-products of the fermentation. (f) By improvement in the drying machines so as to render the artificially dried cacao equal to the sun-dried product.—*H. N. Vinall.*

2400. Smith, Harold Hamel. The London cocoa market. Tropical Life 15:14–16. 1919.—A compilation showing mainly the movement of the cacao bean in trade. The most interesting part is a tabulation showing the quantity of raw cocoa at London, England, and Havre, and Bordeaux, France, for the years 1916, 1917, 1918, and 1919 and the sources of the supply in each case. [See also Entries 2401, 2402, 2403, 2404, 2405.]—*H. N. Vinall.*

2401. Smith, Harold Hamel. The London cocoa market. Tropical Life 15:29–32. 1919.—A continuation of the discussion in the previous number showing the movement of raw cacao in the world markets. Tabulations are given showing the imports into the United States for the years 1916, 1917, and 1918 and stocks on hand in London and Havre February 8 and January 31, respectively. [See also Entries 2400, 2402, 2403, 2404, 2405.]—*H. N. Vinall.*

2402. Smith, Harold Hamel. The London cocoa market. Tropical Life 15:45–48. 1919.—Largely an appeal for the extension of the market for cocoa and chocolate and the discussion of the disposition of the cocoa crop of the West Indies. In tracing this movement it was found that 18,000 tons or 75 per cent of the total imports came from West Africa and only 2600 tons from the West Indies. [See also Entries 2400, 2401, 2403, 2404, 2405.]—*H. N. Vinall.*

2403. Smith, Harold Hamel. The London cocoa market. Tropical Life 15:62–64. 1919.—A continuation of the author's previous discussion of the movement of cacao supplies from the different countries and the stocks on hand at London and Havre. [See also Entries. 2400, 2401, 2402, 2404, 2405.]—*H. N. Vinall.*

2404. SMITH, HAROLD HAMEL. The London cocoa market. Tropical Life 15: 78–80. 1919.—A continuation of the discussions of this subject in preceding numbers of this Journal. This article pays especial attention to the effect of the preferential duty of 7 shillings per hundred weight for British colonial cocoa. [See also Entries 2400, 2401, 2402, 2403, 2405.]—*H. N. Vinall.*

2405. SMITH, HAROLD HAMEL. The London cocoa market. Tropical Life 15: 93–96. 1919.—A continuation of previous discussions of the trade movements and present stocks of cacao, especially at London and Havre. An appeal is made to London buyers and manufacturers of cocoa to purchase more of the better grades from the British West Indies. [See also Entries 2400, 2401, 2402, 2403, 2404.]—*H. N. Vinall.*

2406. TRIBOLET, J. Fruit drying. Union South Africa Dept. Agric. Bull. Local Ser. 85: 1-11. *4 fig.* 1919.

2407. VIEHOVER, ARNO. Chinese colza, a valuable new oilseed. Oil, Paint and Drug Reporter 96[18]: 53. *4 fig.* 1919.—See Bot. Absts. 3, Entry 1673.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

2408. ANONYMOUS. The anthocyanin pigments in plants and their chemical, physiological and biological functions. Review of a number of recent papers and books on the anthocyanin pigments of plants. Sci. Amer. Suppl. 84: 2–3, 7. 1919.

2409. ANONYMOUS. [Rev. of: MALMANCHE, L. A. Contribution a l'étude anatomique des Eriocaulonacées et des familles voisines: Restiacées, Centrolépidacées, Xyridacées, Philydracées et Mayacacées. (Contribution to the anatomical study of the Eriocaulonaceae and related families: Restiaceae, Centrolepidaceae, Xyridaceae, Philydraceae and Mayscaceae). Thesis for the degree of doctor of science. Girault: St. Cloud, Paris, 1919.] Bull. Sci. Pharm. 26: 297. 1919.—See Bot. Absts. 3, Entry 1696.

2410. ARISZ, W. H. De structuur van het melksapvaatstelsel bij Hevea. [The structure of the laticiferous system of Hevea.] Arch. Rubbercult. Ned.-Ind. 3: 139–155. 1919.—Contrary to previously obtained results it is shown that the various concentric layers of latex vessels in the stem are connected. These communications are made by a single latex vessel or by more than one or by double bifurcation. The latter gives most complete communication. The larger number of layers at foot of tree is mostly due to communication layers. The laticiferous vessels in main root are continuations of same vessels in stem. Where lateral root is formed the outer laticiferous vessels degenerate and only deepest layers continue in lateral root. In lateral branches the number of laticiferous layers depends on age. Secondary and tertiary laterel branches have only one laticiferous layer from which the latex cannot flow to the tapping cut because the continuation of this layer in the stem has degenerated. Because of the existence of communication between adjacent latex vessels laticiferous layers not opened by the tapping operation can in the long run have influence on the latex yield. Latex in the leaves and secondary and tertiary lateral branches is of no value in tapping.—*W. E. Cake.*

2411. BAILEY, IRVING W. Phenomena of cell division in the cambium of arborescent gymnosperms and their cytological significance. Proc. Nation. Acad. Sci. [U. S. A.] 5: 283–285. July, 1919.—See Bot. Absts. 3, Entry 1932.

2412. BAILEY, I. W. Histology of phloem. [Rev. of MACDANIELS, L. H. The histology of the phloem in certain woody angiosperms. Amer. Jour. Bot. 5: 347–378. 1918. (See Bot. Absts. 1, Entry 578.)] Bot. Gaz. 67: 276. 1919.—The reviewer regards the work of the

author as tending to weaken the absoluteness of the doctrine of recapitulation, stating that "it has been a common morphological fallacy to assume that because the evolution of a selected structure progresses apparently in a given direction the sums of all structures (organisms) are moving in a similar direction."—*H. C. Cowles.*

2413. Beauverie, J. [Rev. of: Briquet, J. **L'appareil staminal des Composées, structure et fonctions de ses diverses parties.** (Structure and function of staminal apparatus in Compositae.) Bull. Soc. Vaudoise Sci. Nat. 51: 208. 1917.] Rev. Gén. Bot. 31: 205–207. 1919.

2414. Benedict, R. C. **The simplest fern in existence.** Amer. Fern Jour. 9: 48–50. *3 pl., 7 fig.* 1919.—*Monogramme dareaecarpa* Hooker is described as the simplest fern in existence. It is a small epiphytic plant found growing among the mosses on the bark of trees. Each leaf has only one vein and one fruiting line, set in a groove along one side of the leaf.—A comparison is made with the four other species of the genus.—*F. C. Anderson.*

2415. Bhide, R. K. **Probable material for the study of the experimental evolution of Oryza sativa, var. plena, Prain.** Agric. Jour. India 14: 494–499. 1919.—See Bot. Absts. 3, Entry 2088.

2416. Bos, J. Ritzema. **Eene eigenaardige monstruositeit bij een aardbei.** [A peculiar monstrosity in a strawberry.] *Tijdschr. Plantenz. 25:* 193–194. *6 pl., 7 fig.* 1919.—A strawberry fruit is described and pictured, two ovarice of which proliferated to form each a small but perfect flower, borne on a slender pedicel with a few small leaflets at its base on the fleshy receptacle.—*H. H. Whetzel.*

2417. Caragol, Franklin B. **The development of the chasmogamous and the cleistogamous flowers of Impatiens fulva.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 144–183. *Pl. 55–67.* 1919.—The author finds that chasmogamous flowers, which are pollinated by hummingbirds and bees, appear in late June and last till early October, and that cleistogamous flowers appear in early June and last through the summer on the lower short side of branches of many plants, under good conditions. Pseudocleistogamous flowers are morphologically chasmogamous buds self-fertilized at various stages. The seeds produced by the two kinds of flowers are the same in size. The morphology of the flower is discussed, with an account of the development of the pollen. A detailed embryologic study of the apparatus follows with a consideration of pollen tube development, fertilization and embryonic development.—*John W. Harshberger.*

2418. Chipplot, J. **Sur les canaux secreteurs de quelques Gesneracées et en particulier de ceux de Monophyllaea Horsfieldii R. Br.** [Secretory canals of the Gesneriaceae, particularly those of Monophyllaea Horsfieldii.] Compt. Rend. Acad. Sci. Paris 168: 525–527. 1919.—The following genera were examined to determine the presence and location of secretory canals: *Klugia, Gesnera, Centrosolenia, Rhytidophyllum, Tydaea, Aeschynanthus, Streptocarpus, Ramondia* and *Monophyllaea. Rhynchoglossum* was not examined. Canals were found only in the stems and leaves of *Klugia* and *Monophyllaea.*—In *Klugia Notoniana* the stele consists of a circle of woody bundles, with 5 to 7 medullary bundles. The canals occur either at the protoxylem points of the outer bundles or at some distance from the medullary bundles. Only the largest bundles are accompanied by canals. In the main vein of the leaf there are five vascular strands, accompanied by 3 canals, 2 of which are adjacent to primary xylem. In the secondary veins there is a single canal situated in the tissue adjoining three vascular strands. In the adult hypocotyl of *Monophyllaea Horsfieldii* the condition is similar to that just described. Here the canals accompany the larger bundles of the circle, occurring rarely with the medullary bundles. In the principal vein of the cotyledon the canals are also associated with the xylem of the larger bundles; the central strands never possess canals. In the lateral veins the lower (inferior) groups of bundles are often accompanied by canals, the upper (superior) do not possess them.—The canals contain an oily resin, yellow in color and odorless.—*F. B. Wann.*

2419. CHURCH, A. H. **Androecium and gynoecium.** Jour. Botany 57: 220–223. 1919.—The spelling and etymology of these terms is discussed, and the variation in usage by different authors is noted. The first use of the terms was by J. ROEPER in Linnaea 1. 433, and the original spelling was *androeceum* and *gynoeceum*. Later in many texts the spelling of the latter term became *gynaeceum*. The author agrees with BOWER in preferring the form given in the title. He states that the Greek derivation does not signify the "female apartment" of the house, but the female place or part of the flower and has no reference to "women." However, "To return to the *-eum* of ROEPER, may be satisfying to the more pedantic; the attitude of BENTHAM (who used *-ium*) is good enough for any English botanist; but the use of *ae* instead of *oe*, is not only distinctly wrong but extremely foolish."—*K. M. Wiegand.*

2420. CHURCH, MARGARET B. **The development and structure of the bulb in Cooperia Drummondii.** Bull. Torrey Bot. Club 46: 337–362 *Pl. 14–16, fig. 1–9.* 1919.—The germination and development of the seedlings of *Cooperia* are described with special reference to the formation of the bulb, which is set deep down into the ground by root-contraction. The mature bulb is described, as well as the formation of offsets, flower scapes and leaves.—*P. A. Munz.*

2421. COLLINS, G. N. **Structure of the maize ear as indicated in Zea-Euchlaena hybrids.** Jour. Agric. Res. 17: 127–135. *Pl. 16–18.* 1919.—Hybrids of maize (*Zea mays*) and its near relative, *Euchlaena mexicana*, offer a partial solution of the puzzling morphology of the pistillate inflorescence of the former. These hybrid plants exhibit intermediate stages between the simple spike of *Euchlaena* and the complex ear of *Zea*. In the parent forms each "metamer" of inflorescence bears a morphological unit of spikelets (either staminate or pistillate; either, two, one sessile and one pedicelled, or one, the second suppressed) which is designated by a new term, *alicole*. There is evident in a series of hybrid forms the increasing of alicoles through the twisting of the axis of a simple spike; the reappearance of suppressed spikelets; the increase, crowding, and association in pairs of alicoles, forming the typical ear. Some structural features of the latter can be better explained by the theories of fasciation, or "reduced branches," for which, however, these forms offer no supporting evidence. [See Bot. Absts. 3, Entry 1472.]—*A. J. Eames.*

2422. COULTER, J. M. **Stomata.** [Rev. of: REHFOUS, LAURENT. **Étude sur les stomates. (On stomata.)** Univ. Genève Inst. Bot. IX. No. 6. *110 p. 125 fig.* 1917.] Bot. Gaz. 67: 274. 1919.

2423. COULTER, J. M. **Nature of monocotyledonous leaves.** [Rev. of: ARBER, AGNES. **The phyllode theory of the monocotyledonous leaf, with special reference to anatomical evidence.** Ann. Botany 32: 465–501. *32 fig.* 1918. (See Bot. Absts. 1, Entry 1324.)] Bot. Gaz. 67: 273–274. 1919.

2424. COULTER, J. M. **Embryo sac and fertilization in Oenothera.** [Rev. of: ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenotheras.** Ann. Botany 32: 279–317. *7 pl., 14 fig.* 1918. (See Bot. Absts. 1, Entry 482, 979, 980.)] Bot. Gaz. 67: 275–276. 1919.

2425. COULTER, J. M. **Angiosperm wood lacking vessels.** [Rev. of: BAILEY, I. W., AND W. P. THOMPSON. **Additional notes upon the angiosperms Tetracentron, Trochodendron, and Drimys, in which vessels are absent from the wood.** Ann. Botany 32: 503–512. *16 pl., 9 fig.* 1918. (See Bot. Absts. 1, Entries 1588, 1602.)] Bot. Gaz. 67: 279. 1919.

2426. COULTER, J. M. **Apogamy in Camptosorus.** [Rev. of: BROWN, ELIZABETH DOROTHY WUIST. **Apogamy in Camptosorus rhizophyllus.** Bull. Torr. Bot. Club 46: 27–30. *2 pl.* 1919. (See Bot. Absts. 2, Entry 285.)] Bot. Gaz. 67: 280. 1919.

2427. COULTER, J. M. **Seedling anatomy.** [Rev. of: HOLDEN, H. S., AND DOROTHY BEXON. **Observations on the anatomy of teratological seedlings. I. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Botany 32: 513–530. *17 fig.* 1918. (See Bot. Absts. 1, Entry 1330.)] Bot. Gaz. 67: 280. 1919.

2428. den Doop, J. E. A. **Ranunculus acris Linné met teruggeslagen kelkbladen.** [**Ranunculus acris L. with reflexed sepals.**] Nederland. Kruidkundig. Arch. 1918: 155–157. May, 1919.—The rather frequent occurrence of specimens with this character, as noted by other botanists, is recorded in various parts of Holland.—*J. A. Nieuwland.*

2429. Dixon, H. H. **Mahogany and the recognition of some of the different kinds by their microscopic characters.** Notes Bot. School Trinity Coll. Dublin 3: 3–58. *23 pl.* 1919.—See Bot. Abstr. 3, Entry 2017.

2430. Ensign, M. R. **Venation and senescence of polyembryonic citrus plants.** Amer. Jour. Bot. 6: 311–329. *6 fig.* 1919.—See Bot. Abstr. 4, Entry 1555.

2431. Ensign, M. R. **A staining method for vascular tissue.** Phytopath. 9: 180. 1919. —Use hot water followed by nitric acid, dehydrate, stain in methylene blue, clear and mount in castor oil.—*R. E. Vaughn.*

2432. Gertz, Otto. **Panachering hos Mercurialis perennis L. En morfologisk, anatomisk, och mikrokemisk studie.** [**Variegation in Mercurialis perennis L.**] [Swedish with German résumé.] Bot. Notiser 1919: 153–164. *22 fig.* 1919.—See Bot. Abstr. 3, Entry 2126; 4, Entry 1557.

2433. Guérin, Paul. **L'Urera Humblotii H. Baillon et ses affinités.** [**Urera Humboltii and its affinities.**] Compt. Rend. Acad. Sci. Paris 168: 517–519. 1919.—See Bot. Abstr. 4, Entry 1728.

2434. Henderson, Margaret W. **A comparative study of the structure and saprophytism of the Pyrolaceae and Monotropaceae with reference to their derivation from the Ericaceae.** Contrib. Univ. Pennsylvania Bot. Lab. 5: 42–109. *10 fig.* 1919.—Following a general introduction and historical account of previous investigations, the writer presents the results of her work on morphology and histology of a series of plants, studying the underground root and stem systems, the epidermis, the leaves, the inflorescence and the flowers and flower parts, as well as the fruit and seeds. The conclusions reached are that all of the supposed differences between the Ericaceae and the Pyrolaceae break down except that the ovary is completely five-celled in the Ericaceae and incompletely five-celled in the Pyrolaceae. The distinction is so slight that it seems unreasonable to use it as a basis for separating the two families. The only distinction that holds between the Pyrolaceae and the Monotropaceae is the absence of chlorophyll in the latter; hence these families differ from the Ericaceae only in their gradually increasing saprophytism.—*John W. Harshberger.*

2435. Lohn, P. J. **Untersuchungen über die Blattanatomie von Alpen- und Ebenenpflanzen.** [**Investigations on the leaf anatomy of alpine and prairie plants.**] Recueil Trav. Bot. Néerland. 16: 1–62. *Fig. 1a–4b (8), tab. 12.* 1919.—See Bot. Abstr. 4, Entry 240.

2436. Matouschek. [Rev. of: Mihalusz, V. **A gyermeklánefü tökoksányán rendellenesen megjelenö levélke.** (**Abnormal leaf formation on the floral stem of Taraxacum officinale.**) Bot. Közlemények 16: 109–115. *5 fig.* 1917.] Zeitschr. Pflanzenkrankh. 29: 52. 1919.—Author describes purely teratological phenomenon in *Taraxacum;* i.e., foliation of floral stem. —*H. T. Güssow.*

2437. McLean, R. C. **Studies in the ecology of tropical rain-forest; with special reference to the forests of south Brazil. I. Humidity.** Jour. Ecology 7: 5–54. *1 pl., 21 fig.* 1919.—See Bot. Abstr. 4, Entry 196.

2438. McMurray, Nell. **Stamens of meadow parsnip.** Amer. Bot. 25: 69. 1919.

2439. Melvill, J. Cosmo. **Teratology in Papaver orientale.** Jour. Botany 57: 226. 1919. —A brief note on the occurrence of a gamopetalous corolla on this plant.—*K. M. Wiegand.*

2440. Namakawa, Isawo. **Über das Öffnen der Antheren bei einigen Solanaceen.** [**Dehiscence of the anthers of some Solanaceae.**] Bot. Mag. Tôkyô 33: 62–69. *7 fig.* 1919.—The dehiscence mechanisms are described in some detail for the following: *Lycopersicum escu-*

lentum, *Capsicum annuum*, *Schizanthus pinnatus*, *Solanum nigrum*, *S. Dulcamara*, *S. tuberosum*, *S. melongena*, *Petunia violacea*, *Nicotiana alata* var. *grandiflora*, and *Physalis alkekengii*. Though there is some variation in details, the general mechanism is as follows: The epidermis of the suture is underlain by a special disjunctive tissue from 1 to 7 layers thick. The first changes in these cells are accompanied by an accumulation of oxalic acid and calcium oxalate. The acid then attacks the protoplasm and destroys it. It converts the walls into hemicellulose and finally dissolves them entirely. These changes occur before the flower opens. Actual anthesis is brought about in one of three ways: (a) solution of the middle lamellae of the sutural epidermis, (b) solution of the entire wall, or (c) mechanical rupture of the epidermis through the hygroscopic action of a fibrous layer of cells in the anther wall —*Leonas L. Burlingame.*

2441. PHILLIPS, EDWIN PERCY. A note on the pollination of Cyanella capensis Linn. South African Jour. Sci. 15: 500–502. 1919.—In *Cyanella capensis* the bud is at first vertical, then becomes horizontal and finally pendulous. In the latter stage it expands. The flower is protandrous, and the six stamens are arranged in three groups of 3, 2, and 1. The tip of the style curves upwards and the stigmas lie near the apices of the lateral stamens in such a position as to favor self pollination. As the flower closes the posterior stamens exude a fluid laden with pollen grains, which ensures pollination if other methods fail. The flower is also evidently adapted for cross-pollination by insects, but this has not been verified.—*E. P. Phillips.*

2442. RECORD, SAMUEL J. Storied or tier-like structure of certain dicotyledonous woods. Bull. Torrey Bot. Club 46: 253–273. 1919.—Tier-like arrangement of the secondary elements is characteristic of many dicotyledonous woods and is seen in longitudinal section, particularly the tangential, as bands or striations called "ripple marks." In such woods the cambium cells are in tangential as well as in radial seriation but it is often only in the thicker stems that this storied structure is evident and it may or may not extend to all the secondary elements: rays, vessel-segments, tracheids, wood fibers, and wood parenchyma strands. The storied structure is found in the secondary phloem also. "Ripple marks" have been reported for many woods of many families, particularly tropical ones, and are often constant enough for use as diagnostic characters. A table is given for many woods indicating what elements are storied, how regular the lines are, how visible, and giving tier height and measurements. —*P. A. Munz.*

2443. ROMELL, LARS-GUNNAR. Anatomiska Egendomligheter Vid en Naturympning av Gran På Tall. [Anatomical characteristics in a natural graft of spruce upon pine.] Meddel. Statens Skogsförsökanst. 16: 61–66. *2 fig.* 1919.—A live spruce branch (*Picea excelsa*) was found growing on a 56-year old pine (*Pinus sylvestris*) in the province of Östergötland, southern Sweden. Investigations showed that the branch had lived without communication with the mother spruce tree for at least 14 years. Microscopic examinations show the union to be incomplete in places, but in other places it is so perfect that the exact boundary line between spruce and pine cells is not distinguishable. Morphologically the cells of the two species retain their original characteristics, but physiologically they function harmoniously as parts of a single organism.—*G. A. Pearson.*

2444. RUSSELL, ALICE M. A comparative study of Floerkea proserpinacoides and allies. Contrib. Univ. Pennsylvania Bot. Lab. 4: 401–418. *Pl. 91–92.* 1919.—Two plants were studied microscopically and macroscopically, as representing each of the two genera of the family Limnanthaceae, viz. *Floerkea proserpinacoides* and *Limnanthes Douglasii*. The root, stem, leaf, flower and fruit in their anatomical features show a striking similarity in both, *Floerkea* indicating by its reduced members that it is a form derived from *Limnanthes*. *Limnanthes* is a western plant, *Floerkea* is found in the east and west. Various species of *Limnanthes* represent transition types which range from large pentamerous types through smaller tetramerous species to those with trimerous flowers characteristic of the genus *Floerkea*. Since the genus *Floerkea* overlaps the distribution areas of pentamerous and tetramerous forms,

it is likely to be a type evolved from them and the two genera might be included in the same genus; although the author believes that Robert Brown's separation of them is correct.—*John W. Harshberger.*

2445. Soueges, R. **Les premières divisions de l'oeuf et les différenciations du suspenseur chez le Capsella Bursa-pastoris Moench. [The first divisions of the egg and the differentiations of the suspensor in Capsella Bursa-pastoris Moench.]** Ann. Sci. Nat. Bot. X, 1: 1–28. 1919. —The first division of the egg was found to give an apical and a basal cell, separated by wall at right angles to length of pro-embryo (horizontal); next mitoses led to horizontal wall across basal cell and vertical wall in apical cell, producing 4-celled stage of pro-embryo. Author points out that subsequent history of 2 lower cells of this stage has not been well known, and he made a cell lineage study on these two lower cells. The lower one of the 2 gave rise to a vesicular basal cell and 2 cells of filamentous part of suspensor; the second (intermediate cell of four-celled pro-embryo), by a horizontal division wall gave 2 cells, and later by similarly redividing made progeny of intermediate cell 4; a total of 6 cells made up filamentous part of suspensor at this stage. Last phase in development of suspensor is that which leads to hypophysis: of 6 cells just mentioned, 4 basal ones made part of adult suspensor and divided no further; terminal 2 divided transversely once, making a total of 8 for filamentous portion of complete suspensor; the terminal cell became hypophysis. Typically, then, of cells present at 4-celled stage, intermediate (second from base) gave rise to 6 distal cells of suspensor; and basal cell of 4 led to 2 cells of suspensor and vesicular cell at base of pro-embryo. Some exceptional pro-embryos discussed. One seemed due to an additional direct (amitotic) division in vesicular cell.—*James P. Kelly.*

2446. Steckbeck, D. Walter. **The comparative histology and irritability of sensitive plants.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 185–230. *Pl. 58–65.* 1919.

2447. Steil, W. N. **Secondary prothallia of Nephrodium hirtipes HK.** Trans. Amer. Microsc. Soc. 38: 229–234. *Pl. 25–26.* 1919.—Culture medium used was sphagnum saturated with Knop's solution placed in small Stender dishes and thoroughly sterilized. Healthy prothallia were placed on this medium and exposed to subdued light for two weeks. Short filaments one cell thick were produced from the margins and both surfaces of the prothallia. The cultures were then placed in a Wardian case under favorable light conditions. The filaments broadened out and became heart shaped, and when cut off became independent prothallia and produced embryos apogamously. Several other species of ferns under the same treatment produced prothallia; but only in the case of *Nephrodium* were embryos produced apogamously.—*S. H. Essary.*

2448. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. 57: 125–126. 143–145. *Fig. 10–12.* 1919.—See Bot. Absts. 3, Entry 1697.

2449. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. 57: 183–188. *Fig. 13–15.* 1919. —See Bot. Absts. 3, Entry 1698.

2450. Taylor, William Randolph. **On the production of new cell formations in plants.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 271–299. *Pl. 71–78.* 1919.—The author gives a summary of previous work done on injecting chemicals into plant tissues. He experimented with chestnut trees and various herbaceous plants by injecting into them distilled water, chloroform water, ammonia, lithium carbonate, copper sulphate and picric acid, noting the effect of the injection on the general growth of the plant and the tissue reactions. As a result of the experiments, he considers that all the elements of the normal stem are capable of extensive multiplication unless they have been modified by cuticularization, lignification or suberization. Cells that are collenchymatous are notwithstanding able to proliferate freely. From these proliferated areas there may be formed cambioid zones that give rise to cork, to

xylem, and possibly to phloem. The initial multiplication may be started by mechanical or chemical means. The chemical irritation, if it suffices to cause tissue destruction, may have an ultimate effect similar to mechanical irritation.—*John W. Harshberger.*

2451. TISON, A. **Sur le suspenseur du Trapa natans L.** [On the suspensor of Trapa natans L.] Rev. Gén. Bot. 31: 219–228. *1 pl., 5 fig.* 1919.—The suspensor cells in the proembryo of *Trapa natans* enlarge enormously and push the embryo proper to the base of the embryo sac, which has no endosperm. About the base of the embryo the suspensor forms a circular outgrowth; on one side this produces a tongue-like process which establishes intimate union with the nucellar tissue of the chalaza and acts for some time as an absorbing organ. Later the embryo grows and resorbs the large suspensor almost completely.—*L. W. Sharp.*

2452. TURRILL, W. B. **Female flowers in Plantago lanceolata.** Jour. Botany 57: 196. 1919.—A brief note on the occurrence of several plants in the Kew Gardens with shrivelled and sterile anthers. These are compared with others with aborted stamens described in the Botanical Bulletin (Botanical Gazette) 1: 45. 1876.—*K. M. Wiegand.*

2453. VAN WISSELINGH, C. **Bijdragen tot de Kennis van de zaadhuid. Derde bijdrage: Over de zaadhuid der Papaveraceen en Fumariaceen.** [Contributions to a knowledge of seed-coats. Third contribution: On the seed coats of the Papaveraceae and Fumariaceae.] Pharm. Weekblad 56: 849–865. *1 pl., 5 fig.* 1919.—The author found that in the seeds of the different species of Papaveraceae and Fumariaceae under examination the innermost integument and the nucellus are separated by a cuticle, which starts at the site of the embryo. The two inner cuticles are therefore no new formations.—In the ripe seeds these inner cuticles are still present and are still further developed, while the cuticle which covers the epidermis of the seed outside has become weaker and gives no longer reactions characteristic for cork-tissues and cuticles. *Sanguinaria* is an exception to this rule, since in the ripe seeds the cuticle between the integuments has disappeared. The inner cuticles in the ripe seeds indicate the borders of the integuments. In the ripe seeds cork-tissue has developed in the chalaza which is connected with the inner cuticle. This cuticle together with the cork-tissue form in the ripe seeds a coating around the endosperm and the embryo, which is only slightly permeable to different substances.—An exhaustive review of the literature on this subject is given. [See also Bot. Absts. 3, Entry 2809.]—*H. Engelhardt.*

2454. VAN WISSELINGH, C. **Bijdragen tot de kennis van de zaadhuid. Vierde bijdrage: Over de zaadhuid der Cruciferen.** [Contributions to a knowledge of seed-coats. Fourth contribution: On the seed-coats of the Cruciferae.] Pharm. Weekblad 56: 1246–1271. *Pl. 2, fig. 13.* 1919.—See Bot. Absts. 3, Entries 2453, 2809.

2455. WALDRON, RALPH AUGUSTUS. **The peanut (Arachis hypogaea) its history, histology, physiology and utility.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 301–338. *Pl. 79–80.* 1919. —See Bot. Absts. 1, Entry 999; 4, Entry 139.

2456. WEATHERWAX, PAUL. **The ancestry of maize—a reply to criticism.** Bull. Torrey Bot. Club 46: 275–278. 1919.—See Bot. Absts. 3, Entry 1045.

2457. WEINOART, W. **Kleine Mitteilungen.** [Minor contributions.] Monatsschr. Kakteenkunde 29: 18–19. 1919.—See Bot. Absts. 3, Entry 3028, also 3029.

2458. YOUNGKEN, HEBER WILKINSON. **The comparative morphology, taxonomy, and distribution of the Myricaceae of the Eastern United States.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 339–400. *Pl. 81–90.* 1919.—There are five good species of Myricaceae and a hybrid between two of these species along the eastern seaboard of the United States. The evergreen, *Myrica cerifera*, extends northward as far as Tuckahoe River, New Jersey. *Myrica carolinensis* of wide distribution along the coastal plain is deciduous. The hybrid between these two species (*Myrica Macfarlanei*) has leaves which are intermediate in duration, shape, thick-

ness and coloration between the parents.—*Comptonia asplenifolia*, from Nova Scotia to Tennessee, is strictly deciduous. *Myrica Gale*, a deciduous species, is distributed through northern regions, while *Myrica inodora* is evergreen. Seedlings are here described for the first time and their comparative morphology and that of the adult plants are traced. The author finds that the characteristic root-tubercles are due to *Actinomyces myricarum*, first described as the causal organism by himself. Exact phenological records have been kept, as to the maturation of the floral parts and the period of blossoming in April and May. Other details with a list of synonyms and a bibliography are given.—*John W. Harshberger.*

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

2459. Gardner, Nathaniel Lyon. **New Pacific Coast marine Algae, IV.** Univ. California Publ. Bot. 6: 487–496. *Pl. 42.* Jan. 4, 1919.—The following new species, forms, or combinations are proposed by Setchell and Gardner: *Anabaena propinqua*, *Ulothrix pseudoflacca* f. *maxima*, *Rhizoclonium lubricum*, *Hormaiscia sphaerulifera*, *H. vancouveriana* (Tilden) and *H. grandis* (Kylin). The following new species is proposed by the author separately, viz., *Codium Setchellii*.—*W. A. Setchell.*

2460. Gee, N. G. **A beginning of the study of the flora and fauna of Foochow and vicinity.** Jour. Roy. Asiatic Soc. North-China Branch 50: 170–184. 1919.—Contains lists of fresh-water algae, diatoms, and fungi.—*E. D. Merrill.*

2461. Naumann, Einar. **Über das Nachweisen gewisser Gallertstrukturen bei Algen mit gewöhnlichen Farbstiften.** [Demonstration of gelatinous structures in algae with ordinary crayons.] Zeitschr. Wiss. Mikrosk. 35: 243–244. 1919.

2462. Skvortzow, B. W. **Notes on the agriculture, botany and the zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—This article consists of 31 chapters, long and short, and is a potpourri, as the title indicates. The botanical subjects discussed are dye plants; the fresh-water algae of southern China; Manchurian wheat; medicinal plants; growth of weeds and algae; Shanghai fresh-water algae; the use of *Nostoc* as food; bibliography of the algae of China; wild vegetables of Manchuria; dimensions of trees in Manchurian forests; the little known and new oil plants in Manchuria; the cultivated water plants in China; the flowers of Manchurian wild apricot; Kaoliang, barley and maize; a list of plants growing at Foochow; the use of *Equisetum* in China; on new Flagellata from Manchuria. In the last chapter about 40 species and varieties of flagellates are described as new, many of which are figured.—*E. D. Merrill.*

2463. Weet, George. **Amphora infiexa, a rare British diatom.** Jour. Quekett Microsc. Club II, 14: 35–40. *Pl. 2.* 1919.

2464. Yendo, Kichisaburo. **The germination and development of some marine algae.** I. Bot. Mag. Tôkyô 33: 73–93. *1 pl., 2 fig.* 1919.—*Porphyra leucosticta* var. *suborbiculata* and *P. linearis* are rock-inhabiting species abundant on the shores of Oshoro Cove near the Marine Laboratory of the Hokkaido Imperial University. To study them the author had built a sloping concrete block on a reef where the algae grew abundantly. The block was 4 feet high, terraced 3 inches wide every foot, and inclined about 45°. The first spores were found in late October attached to the block and to the 60 stones set into the terraces. Repeated towings with fine nets failed to reveal any spores in the water. The development of these spores into mature fronds was followed and the current account of carpospore formation confirmed. In April following, fronds with mature carpospores were transferred to the laboratory and cultivated in beakers. The water was kept at a temperature of 6–14°C. and the cultures were carried on in a well-lighted room but not in direct light. The carpospores germinated in the second week. In about 5 weeks mature branched filaments were produced. Certain

cells enlarged and formed gametes. The female were laterally biciliate and measured about 1.5–2μ by 3–3.5μ. The male were motile but the cilia were not observed. They measure about 1 by 1.5μ. Actual fusion was not observed nor was the fate of the oospore determined. Circumstantial evidence is offered to support the presumption that they and not the carpospores are the spores found on the rocks in October and which give rise to the ordinary fronds of the plant. Further particulars are promised in a second paper.—*Leonas L. Burlingame.*

2465. ZIMMERMANN, C. **IX Contribuição para o estudo das diatomaceas dos Estados Unidos do Brazil. [Ninth list of Brazilian diatoms.]** Broteria Ser. Bot. 17: 5–16. 1919.—The article continues a series begun in 1913. Forty-one species and six varieties, none new, are listed without description, but with copious references to literature and brief citations of localities. —*Edward B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

2466. ANDREWS, A. LEROY. [Rev. of: HESSELBO, AUG. **The Bryophyta of Iceland.** In: ROSENVINGE, L. K., AND EUG. WARMING. The botany of Iceland 1: 395-477. *39 fig.* 1918. (See Bot. Abstr. 1, Entries 470, 1040, 1048.)] Bryologist 22: 4–5. 1919.—The reviewer points out the care with which the author worked, but notes the lack of an adequate discussion of the relation between the flora and the geologic substrata, and corrects certain erroneous statements in distribution.—*Edward B. Chamberlain.*

2467. ANDREWS, A. LEROY. **Notes on North American Sphagnum—VIII.** Bryologist 22: 45–49. 1919.—The author continues from the seventh number of this series (Bryologist 20: 84–89. 1917) an account of the characters, ranges and specific value of the species of the group *Cuspidata*. The following are among the conclusions reached: *S. tenellum* Pers. (not [Schimp.] Klinggr.) is the correct name for *S. molluscum* Bruch; *S. cuspidatum* Ehrh., is closely related to, but not a form of, *S. recurvum* (Beauv.) Russ. and Warnst, and many artificial species belong here; *S. cuspidatum* var. *Torreyi* (Sull.) Braithw., is connected with the typical form of the species by too many forms to rank as more than a variety; *S. cuspidatum* var. *serrulatum* Schlieph., is an aquatic variant of more than formal value. At the close of the paper the author notes the occurrence of *S. Aongstroemii* Hartm. at Cape Nome, Alaska, the second record for the American mainland.—*Edward B. Chamberlain.*

2468. EVANS, ALEXANDER W. **Notes on North American hepaticae—VIII.** Bryologist 22: 54–73. *2 pl., 15 fig.* 1919.—Author discusses in detail and figures *Nardia fossombronioides* (Aust.) Lindb., *N. subelliptica* Lindb., and *N. rubra* (Gottsche) Evans, comb. nov., this species including Pacific Coast material previously called *N. crenulata* (Sm.) Lindb.; he gives briefer discussions of *Corsinia coriandrina* (Spreng.) Lindb., *Petalophyllum Ralfsii* (Wils.) Nees & Gottsche, and *Leptocolea cardiocarpa* (Mont.) Evans, all new to the United States flora; he corrects previous reports for *Sauteria alpina* Nees from the Gaspé Peninsula (referred to *Clevea hyalina* by error), notes that Alaskan material referred to *Grimaldia fragrans* is really *G. pilosa* (Hornem.) Lindb., that *Plagiochasma Muenchianum* Steph. is a synonym of *P. crenulatum* Gottsche, and that *Porella Cordaeana* (Huehen.) Evans, comb. nov., is the correct name for *P. rivularis* (Nees) Trevis. Two short lists of recently reported additions to the hepatic flora of Florida and Alaska, respectively, are included in the paper.—*Edward B. Chamberlain.*

2469. BURNHAM, STEWART H. **Hepaticae of the Lake George flora.** Bryologist 22: 33–37. 1919.—This is an annotated list of 64 species from the vicinity of Lake George, New York. Previous records and collections have been reviewed.—*Edward B. Chamberlain.*

2470. CHAMBERLAIN, EDWARD B. **Anacamptodon splachnoides var. Taylorlae in Missouri.** Bryologist 22: 16. 1919.—The range of the variety is extended from Georgia to Missouri.—*Edward B. Chamberlain.*

2471. Durand, Elias J. **Encalypta laciniata in central New York.** Bryologist 22: 13. 1919.—The occurrence of this moss, associated with other northern types, is noted from several localities about Ithaca.—*Edward B. Chamberlain.*

2472 Grout, A. J. **Moss notes.—II. Two pogonatums.** Bryologist 22: 37–38. *1 fig.* 1919.—The author contrasts the distinguishing characters of *Pogonatum brevicaule* and *P. brachyphyllum*, illustrating them with a small cut.—*Edward B. Chamberlain.*

2473. Haynes, Caroline C. **List of French hepaticae collected by Major George H. Conklin, M. R. C.** Bryologist 22: 27. *Pl. 1.* 1919.—The author lists twelve species, all from the vicinity of Vichy. The plate is a portrait of Major Conklin.—*Alexander W. Evans.*

2474. Levy, Daisy J. **Preliminary list of mosses collected in the neighborhood of Hulett's Landing, Lake George, N. Y.** Bryologist 22: 23–26. 1919.—The author lists 159 species.—*Alexander W. Evans.*

2475. Lowe, Rachel L. **Collecting in Arkansas.** Bryologist. 22: 14–15. 1919.—The author lists 31 species of mosses from Hot Springs, Arkansas, and gives a brief account of the localities.—*Edward B. Chamberlain.*

2476. Lowe, Rachel L. **Collecting in Oklahoma.** Bryologist 22: 21–22. 1919.—Twenty-seven species of mosses are recorded from the vicinity of Ada, Oklahoma, with a brief account of the localities.—*Edward B. Chamberlain.*

2477. Luisier, A. **Les Mousses de Madère. [The mosses of Madeira].** Broteria 17: 28–48. 1919.—The present paper is the fourth of the series and covers the genera *Cinclidotus* to *Amphidium* (in part). No new forms are described; *Grimmia azorica* Card., is reduced to a subspecies of *G. trichophylla* Grev.; the author quotes descriptions from the less accessible books and appends special discussions of *Crossidium squamigerum*, *Tortula perlimbata*, *T. marginata*, *Anoectangium angustifolium*, and *Amphidium curvipes*. [See Bot. Absts. 1, Entry 757; also next following Entry, 2478.]—*Edward B. Chamberlain.*

2478. Luisier, A. **Les Mousses de Madère. [The mosses of Madeira.]** Broteria: Ser. Bot. 17: 49–66. *Pl. 1.* 1919.—This article is a continuation, without separate title, of a similar one published in the preceding issue of Broteria, and is the fifth of the series. The genera *Orthotrichum* and *Ulota* and the families *Funariaceae* and *Bryaceae* (in part) are included here. No new forms are described, though the accompanying plate figures plants described in the previous part. The author gives critical discussions in the case of *Ulota calvescens* Wils., *Funaria Fritzei* Geheeb, *Haplodontium Natarisii* (Mitt). Broth., *Pohlia proligera* Lindh. var. *tenella* Schiffn., and *Brachymenium philonotula* (Hampe) Broth. [See also next preceding Entry, 2477.]—*Edward B. Chamberlain.*

2479. Rapp, S. **A list of mosses from Sanford, Florida.** Bryologist 22: 50–54. 1919.—This is a list of 137 species or varieties of mosses, collected within ten miles of Sanford; there are no notes, but the author prefaces the list with some general remarks on the region and the habitats. Two new combinations are published, as follows: *Homalotheciella subcapillata* var. *fabronifolia* (Grout) E. G. Britton, and *Isopterygium micans* var. *fulvum* (Hook.) E. G. Britton.—*Edward B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. Olive, *Editor*

2480. Anonymous. **Reconocimiento de las setas.• [Recognition of mushrooms.]** Informacion Agric. [Madrid] 9: 85–86. 1919.—General characters of poisonous and dangerous mushrooms are outlined.—*John A. Stevenson.*

2481. ANONYMOUS [B. O. DODGE]. Index to American mycological literature. Mycologia 11: 227–230. 1919.

2482. BRICK, C. Die Schwarzfleckenkrankheiten der Tomatenfrüchte durch Phoma destructive Plowr. · [Black-spot disease of tomato fruits caused by Phoma destructiva.] Zeitschr. Pflanzenkrh. 29: 20–26. *1 fig.* 1919.—See Bot. Abstr. 3, Entry 2578.

2483. DODGE, E. M. The diagnostic characters of some superficial fungi. South African Jour. Sci. 15: 364–368. 1919.—The group *Hemisphaeriales* as defined by Theissen is divided into 3 families, the *Microthyriaceae*, *Hemisphaeriaceae* and the *Trichopeltaceae*. The structure of the thyriothecia is the basis of division into families, and spore and mycelial characters are used as generic distinction. *Meliola peltata*, a fungus occurring on *Podocarpus* sp., forms a compact disc which recalls the vegetative structure of the *Trichopeltaceae;* another form of exceptional interest is the recently described genus *Meliolaster*, which resembles the genus *Meliola* except in the form of the thyriothecium.—*E. M. Doidge.*

2484. DODGE, E. M. South African Perisporiaceae. II. Revisional notes. Trans. Roy. Soc. South Africa 7: 193–197. *3 fig.* 1919.—The nomenclature of certain species described in a previous paper (Trans. Roy. Soc. of South Africa 5: 713–750. Plates 57–66. 1917) is revised on evidence obtained from examination of fresh collections. The fungus described as *Meliola manca* Ell. & Mart. is *Meliola puiggarii* Speg. *M. torta* is redescribed, and two new species, *M. scabra* and *Perisporina meliolicola* are described.—*E. M. Doidge.*

2485. FITZPATRICK, HARRY MORTON. Rostronitschkia, a new genus of Pyrenomycetes. Mycologia 11: 163–167. *11 pl.* 1919.—A fungus parasitic on the leaves of *Gesneria albiflora* in Porto Rico and Jamaica is discussed. This fungus is a member of the family Cucurbitariaceae of the Sphaeriales and possesses characters not found in related fungi of the genera *Nitschkia*, *Eutype* and *Coelosphaeria*. It is considered as the type of a new genus, *Rostronitschkia*, and as a new species *R. nervincola*. *Nitschkia nervincola* Rehm in litt. is cited as a synonym.—*H. R. Rosen.*

2486. GARRETT, A. O. Smuts and rusts of Utah. III. Mycologia 11: 202–215. 1919.—Five smuts and fifty-nine rusts are listed.—*H. R. Rosen.*

2487. GROVE, W. B. Mycological notes.—IV. Jour. Botany 57: 208–210. 1919.—1. *Phyllosticta* and *Phleospora*. The species assigned to the form genus *Phleospora* have long been the subject of controversy as to whether there is a true pycnidium. The difficulty is frequently due to the presence of the pycnidium in early stages and its absence in later stages of the same plants. Spores produced by the same hymenium may in certain cases differ as to the pycnidia produced. Therefore the same little black dot on a leaf may be placed in *Phyllosticta*, *Phleospora*, *Septogloeum*, or even in *Leptothyrium* or *Septoria*, depending on its age at the moment of observation. *Phleospora Oxyacanthae* Wallr. when closely examined shows intermixed with pycnidia which accord with the description of that species others indistinguishable from those of *Phyllosticta monogyna* Allesch. except in having slightly smaller spores. It is as though the same pycnidium at first produced *Phyllosticta* spores and afterward began to produce the larger *Phleospora* spores which burst the pycnidium open. All the steps between can be traced in sections. But the spores of the *Phyllosticta* stage vary continuously in size, as for instance in *P. monogyna*, which therefore is very possibly a later stage of *Phyllosticta crataegicola* Sacc. A great deal of the confusion in the Coelomycetes is due to the failure to recognize the variation in size, color and complexity of the spore in different stages of the same fungus. For instance, all *Diplodia* spores pass through the stages (1) hyaline and coatinuous (2) pale-brown and continuous (3) darker brown and septate, with often increase in size. In the first stage they have been called *Macrophoma*, in the second *Sphaeropsis*, and in the third *Diplodia*. Thus Dr. Ellis' specimen of *Macrophoma Fraxini* gives also *Sphaeropsis* and *Diplodia* spores in the same pycnidia: and *Phoma pinastri* Lev., *Sphaeropsis Ellisii* Sacc., and *Diplodia Pinastri* Grove are all growth states of the same plant.—The condition

here is likened to the heterospory in various rusts. Other cases are given as follows: *Phleospora Aceris* Sacc. is accompanied by *Phyllosticta Platanoides* Sacc. which at an intermediate stage has been called *Leptothyrium Platanoides*. *Phleospora Ulmi* Wallr. is accompanied by an apparently unnamed *Phyllosticta*. *Septoria Podagrariae* is frequently accompanied on the same spot by *Phyllosticta Aegopodii* Allescb. At one stage this has been placed in *Cylindrosporium*. All these fungi appear to develop later into species of *Mycosphaerella*. Klebahn showed that *Phleospora Ulmi* is the pycnidial stage of *Mycosphaerella Ulmi*. Jaap proved the same for *P. Oxycanthae* and *M. Oxycanthae*. *P. Aceris* is often accompanied by a form which is probably *M. septorioides* (Desm.). *Phyllosticta Aegopodii* and *Phleospora Podagrariae* are almost certainly *M. Aegopodii*. This is all held to show the closely knit relationship of the groups in the third volume of Saccardo's Sylloge and how necessary it is to have a term (Coelomycetes) to include them all. The futility of calling spores "sporulae" in one group and "conidia" in another is shown. Cultures are desirable to prove the above absolutely, but when these forms occupy a definite "spot" on the mycelium and the phenomena reoccur frequently, the result is practically equivalent to a pure culture.

II. *Sphaerulina intermixta* (B. & Br.) and its Allies. Material collected at Birmingham on *Rubus* and on *Rosa damascena* throws light on the relationship of *Sphaeria intermixta* Berkley & Broome, with hyaline spores, and *S. abbreviata* Cooke with "pale brown" spores in linearly aggregated perithecia. The evidence tends to show that these two species differ solely in the "arrangement of their perithecia (a difference which future observations may entirely remove), and that they probably constitute one species (*S. intermixta*) occurring indiscriminately on *Rosa* and *Rubus*, and having in addition on *Rubus* a var. *abbreviata* (Cooke)." Cook's statement that the spores were "pale brown when mature" was probably a slip of the pen. The older material on Rubus showed larger spores and increased septation. The younger less complete form is probably the *Metasphaeria sepincola* (Fckl.) Sacc. on *Rosa* and *Rubus*, and possibly the *Sphaeria sepincola* of Fries. The later 5–6 septate stage is probably *M. brachytheca* (B. & C.) Sacc. on *Rosa*. Material on *Rosa damascena* was in all respects like *Sphaerulina intermixta* except in the larger more septate spores. This could be only a later stage of this species. The fungus on *Rosa damascena* is here described as *S. intermixta* f. *volde-evoluta* f. nov. Incidentally it is interesting that just as Cook recorded his *S. abbreviata* as accompanied by *Hendersonia Rosae* (= H. Rubi?), so the fungus on *R. Damascena* was accompanied by what is usually called *Hendersonia Rosae*, though because of the presence of one or two longitudinal septae this latter material becomes technically a *Camarosporium* as many Hendersonias do. "In fact this increase of septation as the spores of Coelomycetes and Ascomycetes become older and longer is a very common phenomenon, though its occurrence and its fundamental influence on future taxonomy is only just beginning to be recognized."—*K. M. Wiegand.*

2488. Hilton, A. E. **Observations on capillitia of Mycetozoa.** Jour. Quekett Microsc. Club II, 14: 5–12. 1919.—Gives observations on *Lamprodermo columbinum, Arcyria, Lycogola epidendron, Stemonitis, Cribraria,* and *Dictydium.*—*Leva B. Walker.*

2489. Kendall, A. I., A. D. Day, A. W. Walker, and M. Ryan. **The fermentation reactions of certain streptococci. XLII. Studies in bacterial metabolism.** Jour. Infect. Diseases 25: 189–206. 1919.—See Bot. Absts. 3, Entry 2851.

2490. Luijk, A. van. **Fungi van Nederland. I. Geoglossaceae van Nederland.** [Fungi of Holland. I. Geoglossaceae of Holland.] Nederland. Kruidkundig Arch. 1918: 111–144. *18 fig.* May, 1919.—Bibliography, keys, descriptions and indications of generic types of the Geoglossaceae of Holland with critical notes, references to published plates and citations of herbarium specimens. No new species mentioned.—*J. A. Nieuwland.*

2491. Murrill, W. A. **Bahama fungi.** Mycologia 11: 222–223. 1919.—*Polyporus Bracei* sp. nov. is described. The type was collected at New Providence, Bahamas.—*H. R. Rosen.*

2492. MURRILL, W. A. **A new species of Lentinus from Minnesota.** Mycologia 11: 223–224. 1919.—A flesh-colored *Lentinus* from Itasca Park, Minnesota, is described as a new species, *L. Fresmanii*.—*H. R. Rosen.*

2493. MURRILL, W. A. **Fungi from Ecuador.** Mycologia 11: 224. 1919.—28 species of fungi collected by J. N. ROSE are listed.—*H. R. Rosen.*

2494. MURRILL, W. A. **Queer fungous growths.** Mycologia 11: 225–226. 1919.—Simple and irregularly branched structures found in TEXAS, varying in color from a dark-avellaneous tint to a dirty-white, are described. Particles of sand are intimately mixed with fungous mycelium although the central core is free from sand and presents the structure of some vegetable matter.—*H. R. Rosen.*

2495. ORTON, C. R. **Notes on some polemoniaceous rusts.** Mycologia 11: 168–180. 1919.—Author presents a detailed study of type specimens representing some 20 odd described or named species or varieties of rusts occurring on Polemoniaceae. Of this number 4 valid species are recognized on these hosts and 1 species on a cruciferous plant. The valid species are *Allodus giliae* (Peck) Orton, (*Puccinia plumbaria* Peck), under which 16 different synonyms are listed, *Allodus Douglasii* (Ellis & Ev.) Orton, (*Puccinia Douglasii* Ellis and Ev.), with 3 synonyms, *Aecidium Polemonii* Peck, and *Puccinia Giliae* Hark. *Puccinia arabicola* Ell. & Ev., which had been confused with *P. plumbaria*, is considered as a distinct species and occurring on some crucifer, probably *Cardamine Douglasii* (Lam.) Britton, instead of occurring on some species of *Phlox*.—*H. R. Rosen.*

2496. POLE EVANS, I. B., AND A. M. BOTTOMLEY. **On the genera Diplocystis and Broomeia.** Trans. Roy. Soc. South Africa 7: 189–192. *Pl. 19–21.* 1919.—The genus *Diplocystis* has been regarded as monotypic, and only recorded from Cuba, Bahamas and the West Indies. A new species, *Diplocystis Junodii*, is described, collected in Portuguese East Africa. In both genera a number of individuals arise from a common stroma; in *Diplocystis* the stroma is rather thin and saucer-shaped; in *Broomeia* it is rather thick and somewhat columnar. Two species of *Broomeia*, *B. congregata* Berk and *B. ellipsospora* v. Höhn., have been recorded from South Africa, and a third, *B. guadaloupensis* Lev. from Guadaloupe.—*E. M. Doidge.*

2497. RHOADS, ARTHUR S. **The biology of Polyporus pargamenus Fries.** New York State Coll. Forestry Tech. Publ. 11. *197 p., 21 pl., 6 fig.* 1918.—*Polyporus pargamenus* Fries is one of the most common fungi causing sap-rot in nearly all dicotyledonous trees throughout its nearly cosmopolitan range. It is essentially a saprophytic organism but it frequently becomes a wound-parasite in fire-scarred trees in the hard-wood forests of the eastern United States.—Although the sporophores are subject to much variation, the various forms should be considered as one species. It is, however, distinct from *Polyporus abietinus* Fries. Spores are shed intermittently over long periods. The dried sporophores may revive and produce spores after desiccation for at least a year. Spores kept dry for 10 months did not lose their viability. Darkness is conducive to the most vigorous vegetative growth, but light is necessary for the production of sporophores and spores. Basidiospores germinate readily in both tap and distilled water as well as in many kinds of culture media. The short-lived primary mycelium regularly produces oidia which give rise to secondary mycelium. This secondary mycelium may break up soon into oidia or grow into the ordinary vegetative mycelium and eventually produce sporophores. Chlamydospores may form in the secondary mycelium.—Microscopic studies were made of the decay in 5 species of wood and macroscopic studies in 28 other species of wood. Minor variations in the decay of different woods by this fungus are dependent upon the dissimilar structure of the respective woods. Chemical studies of the decay show that the humic by-products vary, but they are similar to those produced by other wood-destroying fungi.—Forest sanitation is suggested as a means of control.—*L. H. Pennington.*

2498. Van der Bijl, Paul A. **Observations on a fungus—Cephalosporium Sacchari Butler—which causes a red rot of sugar-cane stems.** Union of South Africa Dept. Agric. Sci. Bull. 11. 1919.—See Bot. Absts. 3, Entry 2777.

2499. Waksman, Selman A. **Studies in the metabolism of Actinomycetes.** (II.) Jour Bact. 4: 189–216. 1919.—See Bot. Absts. 3, Entry 2860 and 2883.

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

2500. Anonymous. [Rev. of: Henry, A. Woods and trees of Ireland. County Louth Archaeological Journal, 1914.] Jour. Ecol. 7: 105–106. 1919.

2501. Antevs, Ernst. **Die Liassische Flora des Hörsandsteins.** [Liassic flora of Hör sandstone.] Kgl. Svensk. Vetens.-Akad. Handl. 59: 1–71. *6 pl.* 1919.—This interesting flora partially made known from time to time in special papers by Nathorst, Halle and Antevs has attracted special interest as the assemblage containing the branched cycadophyte, *Wielandella*, widely known through Nathorst's admirable restoration. The deposits at Hör, long considered of Rhactic or upper Triassic age and so treated in Wieland's cycad studies, are now referred to the Liassic or lower Jurassic. Their flora, as monographed by the present author, comprises 51 named species besides many fragments and seeds which remain unnamed. The Equisetales are abundant individually and number 5 species: There are 15 ferns representing the genera *Thaumatopteris*, *Woodwardites*, *Clathropteris*, *Dictyophyllum*, *Gutbiera*, *Adriania*, *Cladophlebis*, *Todites*, *Sagenopteris*, *Marattiopsis* and *Rhizomopteris*. It is suggested that *Lepidopteris* may be a surviving representative of the Pteridospermophyta. The Cycadophyta enumerated number 17 and include the genera *Cycadites*, *Nilsonia*, *Pterophyllum*, *Anomozamites*, *Wielandiella*, *Ctenopteris* and *Stenorrhachis*. The genus *Lomatopteris* is left as either a fern or cycadophyte. Seven Ginkgoales are recorded representing the genera *Ginkgo*, *Baiera* and *Czekanowskia*. The Coniferales number 5 and comprise the genera *Swedenborgia*, *Pityophyllum*, *Podozamites*, *Schizolepis* and *Conites*. The following 5 species are described as new: *Cycadites Blomqvisti*, *Pterophyllum intermedium*, *Stenorrhachis dubius*, *Schizolepis hörensis* and *Conites oblongus*.—*E. W. Berry.*

2502. Arber, A. **The "Law of Loss" in evolution.** Proc. Linn. Soc. London, 131: 70–78. 1919.—Discusses the non-reversibility of evolution and its bearing on plant phylogeny. The author considers that this is illustrated by the root-like organs of submerged plants like *Ceratophyllum* and certain Utriculariae where these organs are not morphologically roots. Similar explanations are given for the leaves of Alismaceae and Pontederiaceae which are considered as phyllodes. The absence of interfascicular cambium in the monocotyledons is regarded as a case in point, as is the endosperm of the angiosperms, which is considered a new structure and not the morphological equivalent of the protballial tissue of the lower plants. The morphology of the *Naias* flower and polystely of *Gunnera* are also considered as illustrations of this thesis.—*E. W. Berry.*

2503. Arber, E. A. N. **Remarks on the organization of the cones of Williamsonia gigas (L & H).** Ann. Botany 33: 173–179. *5 fig.* 1919.—Concludes that these Cycadophyte cones were probably monosporangiate. The female cone was of the familiar conical type, with bracts below and seeds and interseminal scales above. The male cone consisted of bracts, an urn-shaped axis (gonophore) with a partly united whorl of sporophylls, and lacked interseminal scales or any sterile infundibular organ.—*E. W. Berry.*

2504. Cantrill, T. C., and B. Smith. **On a boring for coal at Winterbourne, Gloucestershire.** Mem. Geol. Surv. Summary of Progress for 1918: 53–57. 1919.—List of Carboniferous plants found in the bore is given on page 56.

2505. CARPENTIER, A. **Notes d'excursions et remarques sur le Bassin houiller de la Basse Loire. [Notes on coal basin of Loire.]** Bull. Soc. Géol. France IV, 18:-235-247. *Pl. 8, 4.* 1919.—Contribution to Carboniferous flora of Loire basin in France. Enumerates fossil plants of Beaulieu, of which *Archaeocalamites radiatus, Calamites suckowi, Calamites ramosus, Stigmaria ficoides, Pecopteris aspera* and *Telangium sp.* have not hitherto been recorded from this locality. Records for the first time from St. Aubin de Luigne the following: *Calamites suckowi, Sphenophyllum tenerrimum, Pecopteris aspera* and *Diplothmema cf. selaginoides.* Also records plants from la Haie Longue, Sainte Barbe, Varades and Montrelais. The following new or little known forms from the Lower Carboniferous (Culm) are described and figured: *Sphenophyllum Daryi* Bureau, *Macrostachya Bureaui* n. sp., Lepidostrobus cf. *Lepidophloios laricinus* Sternb., Pteridosperm seeds, *Zeilleria moravica* Bureau, *Lagenospermum acutifolia* Bureau.—*E. W. Berry.*

2506. CARPENTIER, A. **Notes palaeophytologiques sur le Carbonifère du Bassin de la Basse-Loire. [Palaeophytological notes on the Carboniferous of the basin of the Basse-Loire.]** Rev. Gén. Bot. 31: 81–93. *1 pl.* 1919.—A record of observations on the Carboniferous flora of the basin of the Basse-Loire, based on specimens in the collections of the University of Angers and on new material. Among the forms noted are: *Sigillaria, Lyginodendron* and *Syringodendron;* the Pteridosperm fructifications *Sphenopteris Dubuissoni, S. tenuifolia Linkii, Neuropterocarpus ellipticus, Zeilleria moravica* and *Pterispermotheca* (nov. gen.); *Sphenopteris depauperata; Guilielmites umbonatus.* Some remarks on xerophytism in the Carboniferous are included.—*L. W. Sharp.*

2507. CARPENTIER, A. [Rev. of: SEWARD, A. C. **Antarctic fossil plants. British Museum of Natural History. (British Antarctic "Terra Nova" expedition, 1910.)** Nat. Hist. Repts., Geology 1: 1–49. *Pl. 1–8, maps A–C, fig. 1–6.* 1914.] Rev. Gén. Bot. 31: 350–352. 1919.

2508. CHAPMAN, F. **On the age of the Bairnsdale Gravels; with a note on the included fossil wood.** Proc. Roy. Soc. Victoria 31 (n. s.) : 166–175. *10 pl., 1 fig.* 1918.—Describes two species of petrified wood of *Eucalyptus* from Bruthen, Gippsland, Victoria, of supposed Pliocene age.—*E. W. Berry.*

2509. FRITEL, P. H. [Rev. of: COLANI, M. **Essai sur les flores tertiaires du Tonkin. (Tertiary floras of Tonkin.)** Bull. Serv. Geol. de l'Indo-Chine.] Rev. Gén. Bot. 31: 270–272. 1919.

2510. GUILLAUMIN, A. **Notes de Palaeobotanique Néo-Calédonienne. [New-Caledonian paleobotanical notes.]** Rev. Gén. Bot. 31: 273–276. *1 pl.* 1919.—The New Caledonian flora of the Permo-Trias had numerous ferns and conifers analogous to those of the Permian. No evidence for the presence of *Glossopteris* has yet been found, in spite of its abundance in New Zealand and other southern lands. In the collections of the Geological laborstory of the Faculty of Sciences in Paris are specimens of *Taeniopteris, Sphenopteris* and gymnosperm leaves from the Permian of New Caledonia, and *Araucarioxylon australe* from the Triassic. References to previous works on the subject of New Caledonian paleobotany are given.—*L. W. Sharp.*

2511. HESSELMAN, HENRIK. **Iakttagelser över Skogsträdspollens Spridningsförmaga. [Dissemination of pollen from forest trees.]** Meddel. Stat. Skogsforsoksanst. 16: 27–60. *1 fig.* 1919.—See Bot. Abstr. 4, Entry 232.

2512. JESSEN, KNUD. **Mindre Middelelser om Fortidens Plantevaekst i Danmark. [Short communication on Denmark's past vegetation.]** Bot. Tidsskr. 36: 51–56. 1917.

2513. KIDSTON, R. **List of the fossil plants from the Coal Measures of the Borings at Bere Farm, Elham, Folkestone and Lydden Valley, Kent.** Mem. Geol. Surv., Summary of Progress for 1918: 46–49. 1919.—The probable connection of the Carboniferous of Britain

with that of Belgium, Holland and northeastern France beneath the thick series of Mesozoic and Cenozoic rocks bordering the Channel is further substantiated by these deep borings in Southeastern England where the Coal Measures were reached at 1598, 1358, 1487 and 920 feet in the respective bores enumerated in the title of the report. In all cases it was possible to identify a considerable variety of well known Carboniferous plant species from these bores. These are enumerated and briefly discussed.—*E. W. Berry.*

2514. Nathorst, A. G. **Die erste Entdeckung der fossilen Dryasflora in der Schweiz.** [First discovery of Swiss fossil Dryas flora.] Geol. Fören. Förhandl. 41[5]: 454–456. 1919.

2515. Nathorst, A. G. **Zwei kleine paläobotanische Notizen.** [Two short notes on paleobotany.] Geol. Fören. Förhandl. 41[5]: 457–459. 1919.—Refers *Dictyodendron Kidstonii* from the Paleozoic of Spitsbergen to the genus Arctodendron because the former genus is preoccupied, and suggests that *Ginkgo adiantoides* from the Tertiary of Spitzbergen may represent the existing *G. biloba.*—*E. W. Berry.*

2516. [Nordstedt, C. T. O.] [Swedish rev. of: Hasselman, H. **Iakttagelser öfver skogsträdens spridningsförmåga.** (Observations on the powar of distribution of forest trees.) Medd. Statens Skogsforsokaanst. 16: 27–66. 1919.] Bot. Notiser 1919: 167–168. 1919.—See Bot. Absts. 4, Entry 232.

2517. Seward, A. C. **Fossil plants.** Vol. 4. Cambridge, 1919.—This, the concluding volume of the Cambridge text on fossil plants, is devoted to the Ginkgoales, Coniferales and Gnetales. In each case the recent representatives are described before the fossil forms are considered, the discussion of the recent Coniferales being especially full. New generic names proposed are **Ginkgoites, Mesembrioxylon** and **Cupressinocladus.** The recent conifers are segregated into the following nine families: Araucarineae, Cupressineae, Callitrineae, Sequoiineae, Sciadopitineae, Abietineae, Podocarpineae, Phyllocladineae, and Taxineae. The author regards the Coniferales as monophyletic and considers the Araucarineae as the most ancient family. He believes that the cone scales of this family are morphologically simple ovuliferous leaves, the double cone scales of the Abietineae being derivatives of a simple form of sporophyll, and that the latter family is the most modern.—*E. W. Berry.*

2518. Sumner, F. B. **Adaptation and the problem of organic purposefulness, II.** Amer. Nat. 53: 338–369. 1919.—In case of regulative phenomena like regeneration which cannot be explained by a mechanism specially adapted or preformed for their performance, author holds that responses are results of experimentation or of method of trial and error; absence of a part is thought to serve as stimulus to varied metabolic activities and that such as act to restore normal condition tend to be continued. Author does not believe with Driesch that reparative processes move directly toward end. Perfect regeneration exceptional and formation of useless structures does not argue for a "primary teleology" in nature. Author sees some similarity in regeneration of crystal and of mutilated organisms but restoration in latter is not so direct due to greater complexity of its substance. In course of evolution adjustments between organism and environment (racial adaptations) arose through chance variation, i.e., variation that was causally unrelated to any need to be fulfilled. [See Bot. Absts 3, Entry 2202.]—*J. P. Kelly.*

2519. Twenhofel, W. H. **Pre-Cambrian and Carboniferous Algal Deposits.** Amer. Jour. Sci. 48: 339–352. *5 fig.* 1919.—Discusses algae as agents of rock formation, emphasising their importance and suggesting the term coenoplase for the laminated precipitate of calcium carbonate resulting from algal metabolism. A new species, *Collenia kona,* is described from the Pre-Cambrian Kona dolomite of the Marquette region of northern Michigan. The new genus **Ottonosia** is described from the Permian of southeastern Kansas, and the new genus **Osagia** from the Upper Carboniferous of the same region.—*E. W. Berry.*

2520. Willert, H. **Über Sphenophyllaceen im Saarbrücker Karbon.** [Sphenophyllaceae in Saarbrück Carboniferous.] Glückauf 53: 384–387. *Pl. 2.* 1917.—Discusses the presence of *Sphenophyllum emarginatum, majus, cuneifolium, oblongifolium, angustifolium* and *myriophyllum* in the coal measures of the Saar field.—*E. W. Berry.*

PATHOLOGY

DONALD REDDICK, *Editor*

2521. ADAMS, SAMUEL. **A national law to license and regulate.** Rept. Iowa State Hortic. Soc. 53: 58–65. 1918.—A discussion of the inspection of fruit and the necessity of enacting a national law on the subject.—*L. H. Pammel.*

2522. AFRICA, EMILIO MACASAET. **The minimum application for the control of Hemileia.** Philippine Agric. For. 6: 251–271. 1918.—A brief review of previous literature on spraying of coffee trees is given. Spraying experiments were conducted to determine the strength of Bordeaux mixture that can be used most economically, and the number of applications that should be made, for the control of coffee leaf rust, *Hemileia vastatrix*, both efficiency and cost of treatment being considered. The author concludes that a 3: 3: 50 Bordeaux mixture (which he designates the "stock solution") diluted to three-quarters strength is a profitable concentration and that it should be applied about every 2 weeks.—*Errett Wallace.*

2523. ALLEN, W. J. **Control of peach leaf curl at Yanco Experiment Farm.** Agric. Gaz. New South Wales 29: 490. 1918.—Home-boiled lime-sulfur solution applied while trees were perfectly dormant gave better results than applications made at 2 later dates. This dormant treatment appears also to have controlled "rust."—*D. Reddick.*

2524. ALLEN, W. J., AND W. LE GAY BRERETON. **Powdery mildew of the apple.** Agric. Gaz. New South Wales 29: 408–412. 1918.—Based on experiments the following directions are given for the control of apple mildew: Prune off affected wood; spray four times with iron sulphide. Spray mixture is prepared according to Volck-Ballard formula. Bordeaux mixture and lime-sulfur solution have not given satisfactory results.—*D. Reddick.*

2525. ANDERSON, S. F. **Downy mildew of the vine. A warning.** Jour. Agric. [New Zealand] 16: 367–368. 1918.

2526. ANONYMOUS. **Disease on cacao estates in West Africa.** Tropical Life 15: 38. 1919.—A correspondent on the west coast of Africa reported his cacao trees dying and the trouble was identified by Dr. Guy Marshall of the British Museum as "die-back" fungus, *Diplodia*. Rules for the control of the disease are quoted from a book on cacao by DR. VAN HALL.—*H. N. Vinall.*

2527. ANONYMOUS. **Coffee planting for profit. No. 23.** Tropical Life 15: 4–5. 1919.—Compilated material reporting the appearance of coffee leaf disease (*Hemileia vastatrix*) at the Government farm, Kibos, British East Africa and its control by spraying with quarter strength fungicides such as liver of sulphur and Bordeaux mixture. The occurrence of a species of thrips on the coffee plants in the Nairobi and Kyamba districts is also noted.—*H. N. Vinall.*

2528. ANONYMOUS [B. O. DODGE]. **Index to American mycological literature.** Mycologia 11: 227–230. 1919.

2529. ANONYMOUS. **Seed mixtures for land affected by clavar sickness.** Jour. Bd. Agric. [Great Britain.] 25: 1497–1499. 1919.

2530. ANONYMOUS. **Silver leaf in fruit trees.** Jour. Bd. Agric. [Great Britain] 26: 162–168. *6 fig.* 1919.

2531. ANONYMOUS. **Spraying.** Missouri Bot. Gard. Bull. 7: 19–25. *Pl. 5.* 1919.—Lists of the more common fungous and insect pests with suggestions for control.—*O. T. Wilson.*

2532. Anonymous. **Report on the occurrence of insect and fungus pests on plants in England and Wales in the year 1917.** Bd. Agric. Fisb. Misc. Publ. [London] 21. *38 p.* 1918. —A summary drawn up by Plant Disease Sub-Committee of Technical Committee of Food Production Department, giving occurrence and severity of attack on cultivated plants of insect and fungus pests in 1917.—*Anna E. Jenkins.*

2533. Anonymous. **Tabla para los tratamientos anticriptogamicos e insecticidas de las plantas citricas.** [Spray calender for citrus fruit.] Revist. Agric. Com. y Trab. 2: 442. 1919. —Translated from Ext. Bull. 18, Univ. Florida, by S. C. Bruner and A. Padrón

2534. Anonymous. **Programm und Jahresbericht der K. K. höheren Lehranstalt für Wein- und Obstbau in Klosterneuburg für das Schuljahr 1917–18.** [Annual report of the horticultural institute in K. for 1917–18.] *135 p.* Wien, 1918.—Chiefly entomological, especially on galls caused by aphides.—Notes on grape chlorosis, the mildews (*Plasmopara* and *Oidium*), and on spraying with Kuprol and silver nucleate. [Through abst. by Matouschek in Zeitschr. Pflanzenkr. 29: 105–106. 1919.]—*D. Reddick.*

2535. Anonymous. **Criptogamas de la vid.** [Diseases of the vine.] Informacion Agric. [Madrid] 9: 269–270. *1 fig.* 1919.—A popular account of grape mildew (*Oidium sp.*)—*John A. Stevenson.*

2536. Anonymous. [B. O. Dodge]. **Index to American mycological literature.** Mycologia 11:–284–287. 1919.

2537. Anonymous. **Contra la carie y el carbon de los cereales.** [Against bunt and smut of cereals.] Informacion Agric. [Madrid] 9: 279. 1919.—Formalin treatment for cereal smuts, the formula and method of using.—*John A. Stevenson.*

2538. Anonymous. **Plant legislation in Dominica.** Agric. News [Barbados] 18: 292. 1919.—This is a summary of the plant and seed quarantine regulations in force in the island of Dominica, including recent legislation forbidding the importation into the colony of citrus plants except from the islands of Montserrat, St. Lucia, and Grenada, and of growing or sprouting coconuts from the islands of Trinidad and Grenada.—*J. S. Dash.*

2539. Anonymous. **Recent plant legislation in Grenada.** Agric. News [Barbados] 18: 169. 1919.—Account is given of the quarantine regulations in force with regard to the importation of coconuts.—*J. S. Dash.*

2540. Anonymous. **Plant legislation in St. Vincent.** Agric. News [Barbados] 18: 237. 1919.—This is a summary of the quarantine regulations and cotton disease prevention ordinances.—*J. S. Dash.*

2541. Anonymous. **Botrytis.** Kew Bull. Misc. Inf. [London] 1919: 93. 1919.—In an investigation of *Botrytis cinerea* it has been shown by W. B. Brierley that the pathogene may exist in the host in a free plasmodial state and in this condition pass from cell to cell. He considers that *Botrytis cinerea* is composed of numerous elementary species and that the particular morphological features presented by any particular culture depends upon the elementary species present and upon the nature of the culture medium.—*E. M. Wilcox.*

2542. Anonymous. **Diseases.** Kew Bull. Misc. Inf. [London] 1919: 91–92. 1919.—This is a series of brief notes on the occurrence of the following diseases in England during 1918: wheat stripe rust (*Dicaeoma glumarum*), wheat powdery mildew (*Erysiphe graminis*), gooseberry powdery mildew (*Sphaerotheca mors-uvae*), pine blister rust (*Cronartium ribicola*), tomato damping off (*Phytophthora* sp.) and cucumber leaf blotch (*Colletotrichum oligochaetum*).—*E. M. Wilcox.*

2543. ANONYMOUS. **Onion disease.** Kew Bull. Misc. Inf. [London] 1919: 93–94. 1919.—A discussion of the studies by MISS OWEN of *Sclerotium cepivorum* Berkeley as a pathogene attacking the bulb of the common onion (*Allium cepa*). Infection occurs through the roots. Both conidia and sclerotia are formed on bulbs in the soil but the ascigerous stage has not been found.—*E. M. Wilcox.*

2544. ANONYMOUS. **Black currant rust.** Kew Bull. Misc. Inf. [London] 1919: 94. 1919.—An examination of 200 black currant bushes (*Ribes nigrum*) failed to develop any evidence of the hibernation of the uredinial phase of *Cronartium ribicola.*—*E. M. Wilcox.*

2545. ANONYMOUS. **Potato disease.** Kew Bull. Misc. Inf. [London] 1919: 94. 1919.—In a further study of the skin spot disease of the potato MISS OWEN has shown that the pathogen is distinct from *Spicaria* in which genus it had formerly been placed.—*E. M. Wilcox.*

2546. ANONYMOUS. **Onion diseases.** Kew Bull. Misc. Inf. [London] 1919: 92. 1919.—This is a brief statement regarding a *Sclerotium* disease of the onion (*Allium cepa*) and shallot (*Allium ascalonicum*) and onion smut (*Urocystis cepulae*) in England. This appears to be the first published record of the occurrence of this smut in Great Britain.—*E. M. Wilcox.*

2547. ANONYMOUS. **Plant cancer.** Missouri Bot. Gard. Bull. 7: 51–53. *Pl. 16–18.* 1919.—Popular treatment of the subject including a table of hosts attacked by *Bacterium tumefaciens* and descriptions of the tumors on each.—*O. T. Wilson.*

2548. ANONYMOUS. **Berichten van den phytopathologischen dienst.** [Reports of the phytopathological service.] Tijdschr. Plantenz. 25: 195–200. 1919.—The phytopathological service issues reports on subjects of immediate and practical importance to growers. Four reports have appeared to date. Three of these are here reprinted, viz.: No. 1 on a Fusarium disease in spring wheat; No. 3 on the control of smuts in wheat and barley; No. 4 on the stripe disease of barley; No. 2 on the tomato canker is not reprinted since the article of which it is a brief appears in full in this number of Tijdschrift.—*H. H. Whetzel.*

2549. ANONYMOUS. **Prejudicial effects of treatment with formalin upon the germination of seeds.** Sci. Amer. Suppl. 87: 164. 1919.

2550. ANSTEAD, D. **The treatment of fungoid diseases on estates.** Agric. Jour. India 13: 95–104. 1918.—A lecture delivered at the annual meeting of the United Planters' Association of Southern India, 1917.

2551. APPEL, O. **Die Pflanzkartoffel.** [The potato plant.] Landw. Hefte 36. *59 p., 7 fig.* Paul Parey: Berlin, 1918.—See Bot. Absts. 3, Entry 1348.

2552. ARNAUD, G. **Une maladie de la Rose de Noël (Helleborus niger).** [A disease of Helleborus niger.] Bull. Soc. Path. Veg. France 6: 10–12. 1919.—A smut, *Entyloma ranunculi*, not hitherto reported on this host has been found in two localities in France. It attacks the bases of the petioles near the ground. The leaves slowly die and are usually invaded by a secondary organism, *Coniothyrium hellebori*. Spraying with copper acetate, and sanitary measures are recommended for control.—*C. L. Shear.*

2553. ARTHUR, J. C. **Relation of host and parasite among fungi.** [Rev. of: REED, GEORGE M. **Physiological specialization of parasitic fungi.** Mem. Brooklyn Bot. Gard. 1: 348–409. 1918. (See Bot. Absts. 1, Entry 1024.)] Bot. Gaz. 67: 180–181, Feb., 1919.

2554. ASHBY, S. F. **Leaf roll disease of Irish potatoes.** Jour. Jamaica Agric. Soc. 23: 44–46. 1919.—A résumé of a paper by WORTLEY (Phytopathology 8: 507–529) is given, since it is thought probable that the disease has occurred on potatoes grown in Jamaica from imported seed.' The writer then recommends roguing the fields 6 weeks after planting, the use of healthy seed, and renewal of seed from outside the island at least every second year. —*John A. Stevenson.*

2555. Aubert, L.-G. **L'oïdium et les chênes de l'Ouest de la France. [Oïdium and the oaks of western France.]** Rev. Eaux et Forets 57: 189–195. 1919.—See Bot. Abstr. 3, Entry 1996.

2556. Aunbert, O. **La défense rationnelle de la vigne contre le mildiou. [Rational protection for grapevines against downy mildew.]** Prog. Agric. et Vitic. 69: 445–449. 1918.—A definite plan for spraying the vineyard based on the development of new and unprotected foliage.—*D. Reddick.*

2557. Ball, E. D. **The potato leafhopper and the hopperburn that it causes.** Bienn. Rept. Wisconsin Dept. Agric. 1917–18: 76–102. *Pl. 1–6.* 1918. Also Wisconsin Dept. Agric. Bull. 23: 76–102. *Pl. 1–6.* 1919.—A part of the injury to potatoes usually known as tip burn is caused by the leaf hopper, *Empoasca mali*. This type of tip burn, conveniently designated as hopper burn, appears at first as ". . . . a triangular brown area at the tip of the leaf running back on the midrib . . . . followed by a progressive burning of the margin, usually from the tip backward but occasionally in more or less triangular spots appearing along the margin, each one of these centered in a lateral veinlet. These increase in area and the burnt narrow strip along the midrib remains green and in serious cases this weakens and dies and the leaf shrivels up." Adult parasites live through the winter, fly to the potato fields early in June, lay eggs and disappear during the month of August. Nymphs of the second generation appear during July, remain for the most part, on the particular leaf on which they were hatched, and furnish the adults for hibernation. Effective control measures, so far as worked out, consist of two applications of a contact insecticide applied in such a way as to reach the insect on the under side of the leaf, the first application being made when the burning begins to appear, the second two weeks later.—*Charles R. Stevenson.*

2558. Ball, E. D. **Spray material and application.** Rept. Iowa State Hortic. Soc. 53: 76–85. 1918.—A brief discussion of spraying and spray material.—*L. H. Pammel.*

2559. Ball, E. D. **What burned the potato leaves last summer?** Rept. Iowa State Hortic. Soc. 53: 335–336. 1918.—Ascribes the burning of potato leaves to a minute green leaf hopper (*Empoasca mali*) which hereafter is to be known as the potato leaf hopper.—*L. H. Pammel.*

2560. Ball, E. D., and S. B. Fracker. **White pine blister rust.** Bienn. Rept. Wisconsin Dept. Agric. 1917–18: 40–43. 1918. Also Wisconsin Dept. Agric. Bull. 23: 40–43. 1918.—Eradication of pine trees and species of *Ribes* affected with blister rust (*Cronartium ribicola*) in a limited area was successful.—Scouting in 1918 revealed the disease in 10 counties in which it had been hitherto unknown.—The infected area is too great to warrant further attempts at complete eradication of the disease from the State.—*D. Reddick.*

2561. Ball, E. D., and S. B. Fracker. **The eradication of barberry in Wisconsin.** Bienn. Rept. Wisconsin Sept. Agric. 1917–18: 44–56. 1918. Also Wisconsin Dept. Agric. Bull. 23: 44–56. 1918.—An account of the work done in Wisconsin as a part of the national program to eliminate aecial hosts of *Puccinia graminis* in the "wheat belt."—95,000 bushes are known to have been destroyed but it is estimated that the work of volunteers would bring the number up to 250,000.—Barberry was brought into the State by the earliest settlers and has escaped widely. Many intereating records were traced and are reported.—*D. Reddick.*

2562. Barber, C. A. **Reminiscences of sugar cane work in India.** Internat. Sugar Jour. 21: 390–395. 1919.

2563. Barss, H. P. **International potato disease conference.** Potato Mag. 2[1]: 5–6, 27–30. *6 fig.* 1919.—Chiefly concerns leaf roll, mosaic, spindling sprout, and methods of cooperation. —*Donald Folsom.*

2564. Bartlett, F. A. **Tree surgery.** Sci. Amer. Suppl. 87: 200–201. *5 fig.* 1919.

2565. BEAUVERIE, J. **Sur quelques recherches recentes concernant le role des germes de rouilles contenues dans les semences de Graminées. [Some recent investigations concerning the role of rust spores contained in grass seeds.]** Bull. Soc. Path. Veg. France 5: 83–90. 1918. [Issued April, 1919.]—In the case of rust attacking seeds of grasses the parasite is always localised in the pericarp and does not reach the embryo. Author holds that the spores found on grain provide a means of insuring their propagation from year to year especially in cases where no aecia occur as in *Puccinia glumarum*. Uredinospores found on seed in the spring did not germinate. Teliospores were frequently found but have not been tested. The work of CARLETON, ZUKAL, GASSNER and HUNGERFORD is referred to. The negative results reported by authors are not considered conclusive and the probability of transmission by contaminated seed is maintained.—*C. L. Shear.*

2566. BIERS, P. **Un Heterodera parasite de Gomphocarpus fruticosus. [Heterodera parasitic on Gomphocarpus.]** Bull. Soc. Path. Veg. France 6: 18–19. 1919.—A nematode which is regarded as a biologic form of *Heterodera radicicola* is reported on this host from Nice.—*C. L. Shear.*

2567. BERO, ANTHONY. **A simple method of distinguishing nematods galls of wheat from bunted kernels.** Phytopath. 9: 181–182. 1919.—Bunt infected kernels show an apical tuft of hair or brush. The nematode affected kernels have no brush and may be indented. They frequently form multiple kernels.—*R. E. Vaughn.*

2568. BETHEL, ELLSWORTH. **Puccinia subnitens and its accial hosts.** Phytopath. 9: 193–201. 1919.—Based on author's observations and cultures of the writer up to January 1, 1919, the total number of aecial hosts of *Puccinia subnitens* for California, Colorado, Arizona, and New Mexico, is 76 species. These are of 48 genera and belong to 19 families. Including the collections of others, and from other localities, this number is increased to 84 host species, in 52 genera, belonging to 19 families. These hosts extend through the herbaceous dicotyledons from Polygonaceae to Lobeliaceae. Cultures show no racial tendencies. The aecia vary greatly in form even on the same plant. The chief telial host is *Distichlis spicata*.—*G. Wineland.*

2569. BIERS, P.-M. **Le Coprinus radicans (Desm.) Fr. est-il parasite? [Is Coprinus radicans a parasite?]** Bull. Soc. Path. Veg. France 6: 72–74. May–June, 1919.—The mycelial condition of the species mentioned has been regarded as a golden yellow growth generally referred to *Ozonium* and sometimes specifically to *O. auricomum* Link. The author records observations on the occurrence of *Ozonium* associated with this *Coprinus* on chestnut (*Castanea*) and poplar (*Populus*) under conditions suggesting its parasitic nature.—*C. L. Shear.*

2570. BILLANDO, EMILIO. **Las enfermedades del garbanzo. [Diseases of the chick-pea.]** Informacion Agric. [Madrid] 9: 194. 1919.—This important Spanish crop is seriously attacked by insect pests and a fungous disease. This latter (species undetermined) is controlled by treating the seed before planting with copper sulphate solution and by spraying the crop three times with Bordeaux mixture. Late planting also helps to minimize losses.—*John A. Stevenson.*

2571. BISBY, G. R., AND A. G. TOLAAS. **Good results from spraying in Minnesota.** Potato Mag. 2¹: 12–13. *2 fig.* 1919.—Bordeaux mixture increases yield regardless of late blight (*Phytophthora infestans*).—*Donald Folsom.*

2572. BLAIR, W. SAXBY. **Dusting fruit trees for insects and disease.** Agric. Gaz. Canada 6: 16–18. 1919.—A report is given on the amount of scab and insect injury in an orchard of Gravenstein apple trees where two methods of treatment were used. The standard lime-sulphur arsenate liquid spray was compared with the fine sulphur powder combined with dry arsenate of lead as a dust. The two methods showed little difference in efficiency in controlling scab and insects. Dusting was more expensive in cost of material, but is a time saver. It seems to be a personal question with the grower whether he can dust more profitably than spray.—*O. W. Dynes.*

2573. Blanchard, E., and C. Perret. **Recherches relatives a la maladie de l'enroulement de la pomme de terre effectuées dans le département de la Loire. [Experiments on leaf roll of potatoes in Loire.]** Ann. Serv. Épipb. 5: 245–252. *Pl. 1.* 1918.—Leaf roll has appeared in Loire and adjoining provinces and probably has existed there since 1909. Early varieties like Early rose, l'Institut de Beauvais, Merveilla d'Amerique, and Franco-Russe are especially susceptibla but Richter Impérator, a mid-season variety, has not proved resistant. Violette d'Auvergna appears to possess resistance but is susceptible to rot.—Andrea and Fluck geante are also resistant.—Riebter Impérator (susceptible), when free from leaf roll yielded 4,500 kilos mora per hectare than Violette du Farez (resistant), but under disease conditions yielded 4,300 kilos less.—Tha use of stable manure or of nitrate of soda reduces the loss from leaf roll.—Disinfection experiments indicate that if leaf roll is caused by an organism, the germ does not persist in the soil or on tbe surface of tbe tuber.—*D. Reddick.*

2574. Blanchard, E., and Claude Perret. Snr l'enroulement des feuilles de la pomme de terre. **[Potato leaf roll.]** Compt. Rend. Acad. Agric. France 5: 356–358. 1919.—The results of experiments continuing for several years lead to the belief that nitrogen hunger is tha chief symptom of tha disease. It is considered a degenerativa disease which is brought about by continued asexual reproduction, too frequent planting on the same soil, deficiency in potash, etc. It is ameliorated by abundant fertilization with sodium nitrate, although this is not a cure, at least in the first year. All varieties tested were found subject to tha disease, but not to an equal degree. In even the most susceptible varieties, some individuals proved entirely immune.—*F. A. Bessey.*

2575. Boas. [Weihenstephan.] [Rev. of: Bohm, Fr. Die züchterische Bekämpfung der Blattrollkrankheit der Kartoffeln. (Control, through breeding, of the leafroll disease of potatoes.) Illustr. Landw. Zeitg. 37: 341–342. 1917.] Zeitschr. Pflanzenkrankh. 29: 54. 1919. —Author, from his experiences, states that the hereditary, infectious leafroll disease is to be distinguished from the non-hereditary through the paler color of the leaves. The cause of the hereditary trouble is held to be due to a species of *Fusarium.* Dry warm weather favors the development of the disease. The paper reviews other work done on this trouble to gain a clear meaning of the leafroll diseases. Author refers finally to the question of deterioration, quoting as an example a variety of potato, which he has studied since the seventies of last century. Tha variety is now so badly deteriorated, that one finds it difficult to secure the necessary quantity of seed potatoes.—*H. T. Güssow.*

2576. Braun, Harry. **Presoaking as a means of preventing seed injury due to disinfectants and of increasing germicidal efficiency.** Science 49: 544–545. 1919.—In the course of investigations on the bacterial black-chaff disease of wheat, a new method of seed treatment has been discovered which practically eliminates seed injury due to the use of disinfectants, and at the same time renders pathogenes on the seed coats more susceptible to the action of the disinfectant. The seeds are allowed to absorb water for a definite period in advance of treatment. The saturation of the cells and the cell walls with water before treatment, and the dilution of the full-strength disinfectant beyond the point of injury as it enters the tissues, in accordance with the law of diffusion of dissolved substances, is the explanation of the results obtained. According to this method, infected seeds are soaked in water for ten minutes, then drained and kept moist for six hours. They are then soaked for ten minutes in formalin 1 : 400 solution, drained, and covered for 6 hours. They are then dried over night and planted next day. If copper sulphate is used, presoaked seeds are thoroughly wetted in the 1 : 80 solution, drained and kept moist 20 minutes, plunged for a moment into milk of lime, dried over night and planted. Nine different varieties of wheat, also oats, barley and maize have been treated successfully by this method.—*A. H. Chivers.*

2577. Brick, C. **Bericht über die Tätigkeit der Abteilung für Pflanzenschutz für die Zeit vom 1 Juli, 1916, bis 30 Juni, 1917. [Work of the division for plant protection, 1916–1917.]** Jahrb. Hamburger wiss. Anst. 1918: 16. 1918.—Gooseberry mildew (*Sphaerotheca mors-uvae*

was found in Mecklenburg.—Tomato leaf blight (*Septoria lycopersici*) was controlled experimentally with peroxid but Bordeaux mixture is preferable.—[Through abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 104–105. 1919.]—*D. Reddick.*

2578. BRICK, C. **Die Schwarzfleckenkrankheit der Tomatenfrüchte durch Phoma destructiva Plowr.** [Black-spot disease of tomato fruits caused by Phoma destructiva.] Zeitschr. Pflanzenkr. 29: 20–26. *1 fig.* 1919.—Author records the appearance of this disease on tomato fruits in the Vierlanden region near Hamburg, Germany. Fruits dropped before maturity, showing a circular, increasing, black spot, of from 3 cm. diameter and more around the fruit stem. Spots may appear on other parts of the fruit. Numerous pycnidia were present, which were identified eventually as *Phoma destructiva*. Discusses presence and nature of numerous other fungi observed in association with *Phoma* by himself and others. Recommends destruction of all infected fruits, and rotation.—*H. T. Güssow.*

2579. BRIOSI, G., AND R. FARNETI. **La moria dal castagni (mal dell' inchiostro).** [Black canker of chestnut.] Atti Inst. Bot. Univ. Pavia 2, 15: 43–51. *2 fig.* 1918.—Controversial. —Comparisons are made to show why *Melanconis modonia* should be considered distinct from *M. perniciosa*, *Coryneum perniciosum* and *Fusicoccum perniciosum*.—*F. M. Blodgett.*

2580. BRODRICK, F. W. **A new disease in parsnips.** Agric. Gaz. Canada 6: 461–462. 1919.—Parsnip canker has been found in Manitoba. It is not transferred by means of soil or of diseased tissue spread over the soil. The disease is thought to be the same as that described by Cotton [See Bot. Absts. 3, Entry 395.] a review of whose paper is included.—*D. Reddick.*

2581. BROWN, H. B. **Cotton experiments 1918.** Mississippi Agric. Exp. Sta. Bull. 180. *31 p., 3 fig.* 1919.

2582. BRUNER, ESTEBAN C. **La enfermedad del "mosaico" o de "rayas amarillas" de la caña de azúcar en Cuba.** [Mosaic of sugar-cane in Cuba.] Revist. Agric. Com. y Trab. 2: 437–441. *2 fig.* 1919.—The presence of the mosaic of sugar cane is reported in several centrals in Cuba where it seems probable it was introduced in experimental plantings. A review is presented of the previous experiments with this disease.—*F. M. Blodgett.*

2583. BRUNER, STEPHEN. **La "Phomopsis" de la berengena.** [Phomopsis of the eggplant.] Revista Agric. [Mexico] 4: 31–32. *1 fig.* 1919.—See Bot. Absts. 2, Entry 757.

2584. BURROUGHS, G. D. **Sweet potato storage houses in North Carolina.** Potato Mag. 2: 8–9. *2 fig.* 1919.

2585. CADORET, A. **La lutte contre le mildiou en 1918.** [Grape downy mildew control during 1918.] Prog. Agric. Vitic. 69: 392–393. 1918.

2586. CALVINO, MARIO. **Informe del director.** [Report of the Director.] Informe An. Estac. Exp. Agron. [Cuba] 1917–1918: 1–439. 1919.—Plants under trial were attacked by fungous diseases as follows, *Sphacelotheca sorghi* and *Puccinia purpurea* on sorghum, *Piricularia grisea* on rice, *Sclerotium rolfsii* on *Helianthus tuberosus*, *Phytophthora terrestria* on roselle (*Hibiscus sabdariffa*), *Cercospora beticola* on *Beta cycla*, *Uredo arachidis* and *Cercospora personata* on peanut, *Cercospora sesami* on *Sesamum*, *Pucciniopsis caricae*, *Gloeosporium* sp. and *Rhizoctonia solani* on *Carica papaya*. [See Bot. Absts. 4 Entries 45, 497.]—*John A. Stevenson.*

2587. CAMPBELL, J. A. **Control of brown rot.** Jour. Agric. [New Zealand] 16: 221–222. 1918.—Brief outline of experiments in progress. Brown rot of stone fruits has been unusually severe on account of wet seasons. Repressive measures have not been effective.—*D. Reddick.*

2588. CANIO, R. **Pseudo-tuberculose clinique et experimentale à Penicillium glaucum.** [Clinical and experimental pseudo-tuberculosis due to P. glaucum.] Jour. Méd. Bordeaux, June, 1918.

2589. Capus, J. **Note sur le développement de quelques maladies des plantes pendant la sécheresse. [Note on the development of some plant diseases during drought.]** Bull. Soc. Path. Veg. France 5: 94–97. 1919. [Issued April, 1919.]—Statements are made in regard to the development of black rot of grape, sycamore blight caused by *Gnomonia veneta*, and rust of wheat, during 1918 in France. In April and May there were long, cold, rainy periods followed by long dry periods in June and July. Infection occurred during the wet periods but the parasites continued to develop during the drought, their appearance being delayed by lengthy periods of incubation.—*C. L. Shear.*

2590. Capus, J. **Expériences sur la valeur comparée contre le mildiou de la vigne des bouillies cupriques basiques et des bouillies acides. [Experiments on the comparative value of basic and acid copper mixtures for the control of Plasmopara viticola.]** Ann. Serv. Epiph. 5: 201–209. 1918.—Five different mixtures were employed. Equal protection is afforded by all five mixtures for a period of 20 days but for longer periods the basic mixtures are better. Basic mixtures are immediately effective. Field experiments, which are described, were supplemented by spore germinations studies in the laboratory.—*D. Reddick.*

2591. Capus, J. **Invasion des cultures de pois en Gironde par Heterodera schachti Schmidt. [Heterodera attacking peas in Gironde.]** Ann. Serv. Épiph. 5: 239–244. 1918.—Evidence is presented to show that this nematode is responsible for root rot and death of peas rather than *Fusarium vosinfectum* var. *pisi* although the fungus may be present and help to complete the destruction.—Use of nonsusceptible crops in rotation is suggested as a means of control.—*D. Reddick.*

2592. Carbin, Patricio. **Informe del Departamento de Entomología y Patología Vegetal. [Report of the Department of Entomology and Plant Pathology.]** Informe. An. Estac. Exp. Agron. [Cuba] 1917–1918: 462–465. 1919.—Review of work in plant pathology.—*John A. Stevenson.*

2593. Carpenter, C. W. **Report of the Division of Plant Pathology.** Hawaii Agric. Exp. Sta. Rept. 1918: 10, 35–45. *Pl. 8–10.* 1919.—Freckle or black spot disease (*Phoma musae* n. sp.) affecting the Chinese banana (*Musa cavendishii*) is illustrated and described. The diseases of Irish potatoes investigated are as follows: Mite disease, late blight (*Phytophthora infestans*), wilt (*Fusarium oxysporum*), and early blight (*Alternaria solani*). An annotated list of diseases affecting coffee and miscellaneous island crops is given.—*J. M. Westgate.*

2594. Charmeaux, Francois. **L'ensachage du raisin de table, son origine, ses raisons, ses resultats. [The bagging of grapes, its origin, reasons, and results.]** Jour. Soc. Nation. Hortic. IV, 20: 52–56, 75–79. March and April. 1919.—See Bot. Absts. 3, Entry 2320.

2595. Cheel, E., and J. B. Cleland. **Disease in forest trees caused by the larger fungi.** Forestry Comm. New South Wales Bull. 12. *12 p., 20 pl.* 1918.—Distinguishing characters and distribution are given for about 20 important timber destroying fungi recorded for New South Wales.—*Anna E. Jenkins.*

2596. Chiffot, J. **Sur la présence de l'ergot de seigle sur le blé dit du Manitoba. [The presence of ergot of rye on Manitoba wheat.]** Bull. Trimest. Soc. Mycol. France 34: 192–194. *Pl. 8.* 1919.—The author discusses *Claviceps purpurea* variety *tritici* which he found on Canadian wheat. [See next following Entry, 2597.]—*Fred C. Werkenthin.*

2597. Chifflot, J. **Sur la présence de l'ergot de seigle sur le blé dit "du Manitoba." [The occurrence of ergot of rye on "Manitoba" wheat.]** Bull. Soc. Path. Veg. France 5: 80–82. 1918. [Issued April, 1919.]—The presence of this parasite on Canadian wheat recently introduced into France is reported. It is suggested that this form may be sufficiently distinct to be called *Claviceps tritici monilobae.*—More investigations and observations are necessary in order to determine the danger from this parasite and whether it will pass from wheat to rye or to other grasses. [See next preceding Entry, 2596.]—*C. L. Shear.*

2598. CHILDS, LEROY. **A spray program for the northwest apple orchards.** Better Fruit 13[10]: 13–14. Apr., 1919.—A reprint of a spray program or calendar first published in Better Fruit, April, 1918. It gives complete information for spraying apples in the Pacific Northwest.—*A. E. Murneek.*

2599. CHILDS, LEROY. **Comparative results in controlling codling moth.** Better Fruit 13[9]: 5, 41–46. March, 1919.—This paper deals with comparative results of the effectiveness and economy of dusting and spraying and the use of the spray gun versus the spray rod in combating scab and codling moth on apples in Hood River valley, Oregon. Experimental evidence is offered for the seasons of 1916, 1917, and 1918. Spraying is preferred to dusting. The spray gun has been found to be superior to the spray rod. [See also Bot. Abats. 3, Entry 2321.]—*A. E. Murneek.*

2600. CLUTE, WILLARD N. **The potato wart disease.** Amer. Bot. 25: 95. *1 fig.* 1919.

2601. COCKAYNE, A. H. **Dry rot of turnips. Suggestions regarding control.** Jour. Agric. [New Zealand] 17: 70–73. 1918.—Dry rot, caused by *Phoma napobrassicae*, occurs on turnips and mangolds that have been mechanically injured but Swedes may be affected up to 100 per cent whether injured or not.—Author summarizes investigational work done as follows: (1) Infection appears earlier on early sowings than on late ones; (2) Crops with 20 per cent of bulbs affected on, say, the third week of July may have 100 per cent affected a couple of months later, in September; (3) Little loss is experienced with crops fed off before the middle of July; (4) All varieties of Swedes so far experimented with appear equally affected; (5) Swedes following affected Swede crops are affected at a younger stage than when grown on clean land; (6) Lime appears to delay infection; (7) Stored Swedes covered appear to keep much better than when in the field. Earthing up bulbs stops infection. Recommendation is to substitute some other crops for Swedes until some method of control is developed.—*D. Reddick.*

2602. COLEMAN, LESLIE C. **Spike disease of sandal.** Dept. Agric. Mysore State, Mycol. Ser., Bull. 3. *52 p., 19 pl., 2 fig.* 1917. [Appeared 1918.]—The very *serious* spike *disease* of sandal is rather fully discussed. Large portions of the sandal wood area of India have already become seriously affected. It is considered improbable that unfavorable soil or climatic conditions, overcrowding, association with unsuitable host plants can in themselves engender the disease. It is held more probable that a definite causative agent or organism is involved, and that its subsequent virulence and spread is modified by these external conditions. An accumulation of starch in the leaves, and the death of the haustoria and root tips are striking symptoms. No evidence has been added to show that the attacks of fungi or insects produce the disease. It has been established for the first time that the disease is readily communicable by grafting, and it is considered that it is a virus disease, i.e., comparable to such diseases as peach yellows, the mosaic disease of tobacco, etc. It is noted that other species of plants in the sandal wood area are affected with diseases similar to the spike disease of sandal, but relationships have not as yet been definitely established. The carrying of seed from diseased trees by birds, the dissemination of the virus by insects, and infection from other plants affected with a similar disease, are considered possible means of spread of the spike disease of sandal.—*H. A. Allard.*

2603. COLLARD, J. W. **Control of brown rot. Peach orchard experiments at Henderson.** Jour. Agric. [New Zealand] 16: 275–283. *2 fig.* 1918.—Report, with tabulations of three extensive experiments made to determine the value in brown rot (*Monilia fructigena*) control of orchard sanitation (including soil dressing), dormant and summer spraying and combinations of them. The experience of the first season indicates that practically no repression of the disease was secured. The spraying program included dormant treatments with bordeaux mixture (8 : 6 : 40) and copper sulfate (1 : 15) and summer treatments with bordeaux (2 : 3 : 50), lime-sulfur solution (1 : 30) and atomic sulfur (8 : 100).—Late varieties were more severely affected than early ones although previously they had been thought more resistant.

—Probability of infection increases as fruits approach maturity "and several varieties of peaches and nectarines suffer attack almost entirely during that period" but "considerable number of the best varieties are affected at the rate of 40 per cent when quite green—chiefly just after stoning."—*D. Reddick.*

2604. Coons, G. H. **Michigan experiments on bean disease control.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 104–106. *4 fig.* Feb., 1919.—A popular account of anthracnose and bacterial blight of beans with recommendations as to mode of control.—*E. A. Bessey.*

2605. Coons, G. H. **Bordeaux mixture.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 18–19. *6 fig.* Aug., 1919.

2606. Coons, G. H. **Botanical notes.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 159–162. May, 1919.—Brief notes on the following topics: Barley disease situation, potato spraying, seed-treatment of potatoes, and damping-off of seedlings, with recommendations for treatments in all cases. [See next following Entry, 2607.]—*E. A. Bessey.*

2607. Coons, G. H. **Botanical notes.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 14–17. *Fig. 3–5.* Aug. 1919.—Warning notes on take-all and flag smut of wheat and wart disease of potato, and recommendations to urge spraying for apple scab and the Septoria blight of tomato. [See next preceding Entry, 2606.]—*E. A. Bessey.*

2608. Cordley, A. B. **Possible cause of "Sour Sap" in the Pacific Northwest.** Better Fruit 13[11]: 6, 30–32. May, 1919.—See Bot. Absts. 3, Entry 2325.

2609. Cossette, J. R. **Two years of success with dusting.** Agric. Gaz. Canada 6: 168–169. 1919.—A report of the Oka Agricultural Institute, Quebec.—*O. W. Dynes.*

2610. Cotte, J. **Sur divers parasites des platanes à Nice en 1918.** [On various parasites of sycamore (Platanus sp.) at Nice in 1918.] Bull. Soc. Path. Veg. France 6: 65–67. May-June, 1919.—Besides insects, anthracnose caused by *Gloeosporium nervisequum* and a hypertrophy near the base of the trunk regarded as probably due to a parasite, are described.—*C. L. Shear.*

2611. Cotton, A. D. **Onion smut: a disease new to Britain.** Jour. Bd. Agric. [Great Britain] 26: 168–174. *1 fig.* 1919.—The disease (*Urocystis cepulae*) was first called to the attention of the Board of Agriculture by a grower in 1918, who had also observed the disease in 1917. Upon extended inquiry two former authentic collections were found—one on young leeks and onions near Edinburgh in 1912, and the other on leeks in Northumberland in 1914. In 1918 smut occurred on onions in a number of gardens in that locality. In no case was the original source of the disease determined.—A brief description of the disease is given together with suggestions for its control.—*M. B. McKoy.*

2612. Cromwell, R. O. **A bad outbreak of cedar apple rust.** Rept. Iowa State Hortic. Soc. 53: 127–131. 1918.—A brief discussion of the relation of apple rust (*Gymnosporangium*) to cedar. Calls attention to the severity of the fungus on the Wealthy and in a less degree on Ben Davis and Jonathan varieties.—*L. H. Pammel.*

2613. Daniel, Lucien. **La maladie du chêne, ses causes et son remède.** [Oak disease, its cause and its control.] Trav. et Notices Acad. Agric. France 1: 421–440. 1918.—Oak mildew (*le blanc*) is abundant and destructive because of practices which have reduced the vitality of the trees. Particular objection is made to the practice of decapitating trees in order to force lateral branches which are used for firewood.—*D. Reddick.*

2614. Darnell-Smith, G. P. **Experiments on the control of brown rot in stone fruits.** Agric. Gaz. New South Wales 29: 663–664. 1918.—Cotton wool was saturated with formaldehyde and with sulfur dioxide and placed in perforated boxes inside packing cases of peaches

and nectarines. Both materials reduced the loss from rot in transit but the natural bloom of the fruit was destroyed. Control of rot in the orchard is thought to be the preferable means of reducing such losses.—*D. Reddick.*

2615. DARNELL-SMITH, G. P. A fungous disease of prickly pear. Agric. Gaz. New South Wales 29: 440–441. 1918.—*Opuntia inermis* was found parasitized by a species of *Fusarium* which is not named. There are indications that the fungus may be valuable in helping to exterminate this "pest-pear" and experiments are projected.—*D. Reddick.*

2616. DASH, J. SYDNEY. Quelques conseils aux producteurs de cannes de la Guadeloupe. [Hints to the sugar-cane growers of Guadeloupe.] Sta. Agron. Guadeloupe Bull. 1: 11–30. 1919.—Observations on the Island lead to conclusion that better drainage should be provided. Most soils require lime and stable manure or the use of leguminous soiling crops.—Selection of varieties suitable for Guadeloupe requires more attention. Preparation of soil and general cultural directions are given.—An account of the insects and diseases affecting the sugar-cane in Guadeloupe is presented. It is noted that there are no diseases in Guadeloupe which do not exist in the Lesser Antilles. Root disease, *Marasmius sacchari*, being by far the worst in the colony, is dealt with fully and the usual methods of treatment discussed at some length, viz., healthy cuttings, proper tillage, rotation, sanitation, increased use of farmyard manure, use of bordeaux mixture.—*J. S. Dash.*

2617. DEGRULLY, L. Action des fumures sur la mildiou. [Action of manuring on grape downy mildew.] Prog. Agric. et Vitic. 69: 531–533. 1918.—Heavy applications of nitrogenous fertilisers favor the development of downy mildew.—*D. Reddick.*

2618. DEY, P. K. Studies in the physiology of parasitism. V. Infection by Colletotrichum Lindemuthianum. Ann. Botany 33: 305–312. *Pl. 21.* 1919.—The author investigated the method by which *Colletotrichum lindemuthianum* gains entrance into the pods of two susceptible bean varieties (*Phaseolus vulgaris*). The spores germinate on the surface, sending out a germ tube which forms an appressorium as a result of a contact stimulus. The appressorium becomes fastened to the leaf surface by means of a mucilaginous sheath. The spore is also fixed in some unknown manner. The germ tube curves upward, thus exerting some pressure on the leaf surface. From a part of the appressorium in contact with the cuticle, is developed a peg-like infection thread which ruptures the cuticle. According to the author the penetration of the cuticle is effected merely by mechanical pressure but the subcuticular layers are softened and disorganized, presumably by an enzyme. The infection peg swells to the size of a normal hypha shortly after penetrating the cuticle, grows into the host tissues and produces a small vesicle from which branches ramify. The host cells do not collapse until invaded by the fungus. According to the author *C. lindemuthianum* therefore gains entrance into the host quite as does *Botrytis cinerea.*—*E. C. Stakman.*

2619. DICKSON, J. G., AND A. G. JOHNSON. Studies on stem rust in Wisconsin, 1918. Biennial Rept. Wisconsin Dept. Agric. 1917–18: 56–60. 1918. Also Wisconsin Dept. Agric. Bull. 23: 56–60. 1918.—Studies begun late in the winter and carried throughout the summer were so conducted as to furnish data upon the rôle of the common barberry (*Berberis vulgaris*) in the spread of the stem rust of grains (*Puccinia graminis*). Urediniospores which had formed on the new fall shoots of perennial grasses and winter grains retained their ability to grow until the winter covering of snow had disappeared, about March 2, after which the viability decreased very rapidly. None retained ability to grow after March 30. Observations made at seventeen definitely marked stations in the vicinity of Madison as well as a survey over the southern part of the state, gave no evidence of infections on wheat in advance of the time when they could have come from infected barberries. From observations made at about fifty selected stations it was noted that the original infection was definitely traceable directly to infections on barberries. Spring infection was noted first only in close proximity to infected barberries the spread of the rust being always more abundant to the northeast of the barberry planting. It was observed that the kind of grain that was commonly grown in a locality was universally heavily rusted, while grains new to a locality, with the exception of barley, were rarely rusted.—*L. M. Massey.*

2620. Doidge, E. M. **Common fungous and bacterial diseases of plants.** Union of South Africa, Dept. Agric. Bull. (Local Ser.) 78. 1919.—*An illustrated chart of plant diseases with remedial measures for the use of farmers and fruit growers.—E. M. Doidge.*

2621. Doidge, E. M. **Walnut bacteriosis, Bacterium juglandis Pierce.** South African Jour. Sci. 15: 407–412. 1919.—Walnut bacteriosis occurs in a number of localities in South Africa, and often causes serious damage, especially in wet seasons and in places where rain falls in the spring and early summer. In the Oudtshoorn district, which has a winter rainfall of about 10 inches and little or no summer rain, no bacteriosis has been observed. The organism has been isolated, etudied in pure culture and the disease reproduced by inoculation.—*E. M. Doidge.*

2622. Doidge, Ethel M. **The bacterial blight of beans.** South African Jour. Sci. 15: 503–505. 1919.—The bacterial blight of beans (*Phaseolus vulgaris* and *P. lunatus*) is common in South Africa. The organism is disseminated with contaminated seed both from local sources and imported from overseas. It has been isolated, and studied in pure culture, and the disease reproduced by inoculation; the organism is *Bacterium phaseoli*, originally described as causing bacteriosis in beans in America.—*E. M. Doidge.*

2623. Doidge, Ethel M. **Diseases of stone fruit trees, I. Peach leaf curl. Taphrina deformans** (Fckl.) Tul. South African Fruit Grower 6: 211. 1919.

2624. Doidge, Ethel M. **Walnut blight.** Union of South Africa, Dept. Agric. Bull. 1918[18]. *4 p. 2 fig.* 1918.—*Disease* (caused by *Bacterium juglandis*) is prevalent in all parts of country where conditions are favorable. "The blight only spreads rapidly where there is a good deal of rain and mist during the spring and summer while the nuts are forming."—*D. Reddick.*

2625. Duysen, F. **Holzwucherungen.** [Intumescences in wood.] Sitzungsber. Ges. Naturforsch. Freunde Berlin 1918: 67–82. *14 fig.* 1918.

2626. Easlea, Walter. **Mildew resistant roses: with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. 43: 253–260. 1919.—See Bot. Absts. 3, Entries 2219 and 2256.

2627. Ensign, M. R. **Sweet potato mosaic.** Phytopath. 9: 181. 1919.—The leaves are dwarfed, malformed, and mottled. Yields showed a difference of 300 per cent. There is no evidence that the disease is directly communicable to adjacent plants.—*R. E. Vaughn.*

2628. Eriksson, Jacob. **Zwei russische Gymnosporangieen.** [Two Russian gymnosporangia.] Ark. Bot. [Stockholm] 15: 1–23. *5 pl.* 1919.

2629. Esam, Gordon. **Orchard sprays and spraying.** Jour. Agric. [New Zealand] 17: 103–109. 1918.

2630. Esmarch, F. **Zur Kenntniss des Stoffwechsels in blattrollkranken Kartoffeln.** [Metabolism in potato leafroll.] Zeitschr. Pflanzenkr. 29: 1–20. 1919.—Author inclines to agree with Quanjer who, from his anatomical studies of leafroll, suggests that there occurs an extensive check in the translocation of the assimilates of the leaves. This factor is undoubtedly to be regarded as a symptom of "potato leafroll." He continues that, in consequence of this check, there results an increase of the starch contents in the leaves of leafroll plants. The chloroplasts can only store a limited amount of starch, hence, once this limit is reached, there must result a check to the assimilation, inasmuch as less soluble carbohydrates are produced. As a consequence less reserve materials reach the vegetative centers, and the characteristic dwarfed habit of the plants, as well as their reduced yield in tubers, becomes manifest. Author prefers not to draw any further conclusions relative to the etiology of the leafroll disease. The check in translocation of starch is an important, though

not the only physiological symptom of the disease. Presumably the rolling of the leaves occurs as a consequence of the disturbed metabolism present internally. He doubts, however, whether anatomical abnormalities such as Quanjer's phloem necrosis may be regarded as causal to the reduced translocation of starch.—*H. T. Güssow.*

2631. EUSTACE, H. J. **Horticultural notes.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 133. Feb., 1919.—See Bot. Absts. 3, Entry 2331.

2632. EUSTACE, H. J., AND R. H. PETTIT. **Spray and practice outline for fruit growers.** Michigan Agric. Exp. Sta. Special Bull. 93. *32 p., 6 fig.* 1919.—See Bot. Absts. 3, Entry 2332.

2633. EYRE, J. VARGAS, E. S. SALMON, AND L. K. WORMALD. **Further notes on the powdery mildews and the ammonium polysulphide wash.** Jour. Bd. Agric. Great Britain **25**: 1494–1497. 1919.—During the stage from the germination of the spore through the actual penetration of the leaf tissue and to the formation of the mycelium on the surface of the leaf, the hop mildew (*Sphaerotheca humuli*) "offers the maximum resistance to the fungicide, requiring not less than double the strength which is lethal in the later stage." Two applications of ammonium polysulphide solution at the strength of 1 gallon stock solution to 90 gallons water containing 5 pounds soft soap are required to control the disease. The method of preparation of the stock solution, which is not of a kind that the growers can make for themselves, is given.—The ammonium polysulphide and soft soap wash has proved effective in controlling American gooseberry mildew and consequently may be used in place of lime-sulphur when this material interferes with the marketing of the berries.—*M. B. McKay.*

2634. FARRELL J. **Apple culture in Victoria.** Jour. Dept. Agric. Victoria 17: 287–295. *Pl. 14.* 1919.—Continuation of an earlier article. [See Bot. Absts. 3, Entry 758.] This section deals with the fungous diseases of apples and their control.—*J. J. Skinner.*

2635. FAWCETT, H. S. **Psorosis (scaly bark) of orange trees in California.** California Citrograph 4: 107, 133, 134. *5 fig.* 1919.—This serious orange disease in California manifests itself by an outer layer of bark in certain patches being broken into small irregular pieces and by these being pushed off. Several years usually elapse before the death of the infected limb. The causal organism, if such there is, has not been determined. The progress of the disease is arbitrarily divided into three stages which are described. Suggestions for treatment: first stage, aseptic excission; second stage, light scraping with application of bordeaux paste; third stage, small chance for cure, if on limb, remove; if on trunk, gouge out dead or affected wood, disinfect and paint with benzene-asphalt paint.—*J. E. Coit.*

2636. FAWCETT, GEORGE L. [Rev. of: DRACOPOULOS, JUAN N. **La gomosis de los citrus.** (Citrus gummosis.) Corrientes, 1918.] Rev. Indus. y Agric. Tucuman **8**: 153–155. 1918.

2637. FAWCETT, H. S. **Citrus blast.** California Citrograph 5: 3. *3 fig.* 1919.—A bacterial disease, due to *Bacterium citrarefaciens*, at present confined to northern California. Active only in winter and early spring. The organism destroys leaves, kills back many of the fruiting twigs and results in the formation of reddish brown scabs on the live twigs and shoots usually at and surrounding the base of each dead leaf petiole. The organism does not attack the fruit after it is set. Different varieties are differently affected, the navel orange being most injured and lemons but slightly affected. There appears to be a relationship between the following conditions and the severity of the disease:—direction of the prevailing wind, distribution of rainfall, weakness of tree from neglect, age of tree, and time of maturity of leaves and branches of the year before. A bibliography is appended.—*J. E. Coit.*

2638. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. **Quarantine on account of flag smut and take-all diseases.** Notice of quarantine No. 39 (with regulations). Serv. and Reg. Announce. 64: 77–79. 1919.—Also issued as an unnumbered pamphlet from the office

of the Secretary of Agriculture.—On account of the occurrence in Australia of flag smut (*Urocystis tritici*) and take-all (*Ophiobolus graminis*) and of the former disease also in India and Japan and of the latter disease also in Italy, France, Germany, Belgium, Great Britain, Ireland and Brazil, seed of the following may not be imported in the raw or uncleaned or unprocessed state into the United States from these countries: *Oryza* spp., *Triticum* spp. *Avena* spp., *Hordeum* spp., *Secale* spp. By special permission importation is allowable after inspection and disinfection at port of entry.—*D. Reddick.*

2639. Fisher, D. F. **Apple powdery mildew a serious menace to orchards.** Better Fruit 13[10]: 3–6. *6 fig.* Apr., 1919.—Abridged from an earlier publication. [See Bot. Absts. 2, Entry 764.]

2640. Fisher, D. F. **Factors that influence diseases of apples in storage.** Better Fruit 14[4]: 3. September, 1919.—Diseases affecting apples in storage are separated by the writer into: (1) parasitic and (2) non-parasitic or "physiological diseases." Those of the first group may be prevented either by spraying or by careful handling of the crop, depending upon the mode of attack of the causal organism. Non-parasitic diseases are influenced either by cultural or by storage conditions. Consideration is given to nutrition and irrigation as two of the main cultural factors causing physiological diseases of the fruit. Of the various forms of "physiological breakdown" due to storage conditions, scald is given detailed consideration.—Brief experimental records on irrigation investigations and on control of scald are given.—*A. E. Murneek.*

2641. Fisher, D. F., and E. J. Newcomb. **Controlling important fungous and insect enemies of the pear in the humid sections of the Pacific Northwest.** U. S. Dept. Agric. Farmers' Bull. 1056. *34 p., 18 fig.* 1919.

2642. Foex, Et. **Tubérosités du châtaignier et chancre du rosier.** [Chestnut galls and rose canker.] Bull. Soc. Path. Vég. France 6: 68–71. May–June, 1919.—Excrescences on the chestnut, *Castanea vulgaris*, apparently of the same nature as those described by Hartig as "Holzkugeln" and "Sphaeroblastes" are reported and the morphological characteristics given. The cause is unknown.—The rose canker had *Coniothyrium fuckelii* associated with it and this is regarded as the probable cause.—*C. L. Shear.*

2643. Foex, Et. **Emission et germination des ascopores de Leptosphaeria herpotrichoides.** [The discharge and germination of ascospores of Leptosphaeria herpotrichoides.] Bull. Soc. Path. Vég. France 6: 57–61. May–June. 1919.—See Bot Absts. 4, Entry 1098; also two next following Entries, 2644, 2645.

2644. Foex, Et. **Sur le piétin du blé.** [Foot rot of wheat.] Compt. Rend. Acad. Agric. France 5: 543–548. 1919.—In the Bassin de Paris and other regions, wheat is found very frequently attacked by *Leptosphaeria herpotrichoides*, more rarely by *Ophiobolus graminis*. The former may attack one side of the plant and extend upward one or two nodes, sometimes causing the plant to bend over at or above the surface of the ground. The latter attacks the plant near or below the surface of the ground, usually girdling it. The former produces its perithecia on the stalks as early as May, but they do not have mature spores until the middle of August, the spores being set free from that time on until winter. The perithecia of the *Ophiobolus* are usually found only on the dead stubble and appear later than those of *Leptosphaeria*. *Cercosporella herpotrichoides* was also frequently found, sometimes associated with the one, and sometimes with the other fungus. Its connection could not be proved with either. The earlier the wheat is sown in the fall the more severely it is attacked. It is more severely attacked following beets than after clover or particularly after alfalfa. Sulphate of iron applied to the ground, either before planting the wheat or scattered broadcast on the snow during the winter, delays the appearance of the disease in the spring, but does not prevent its subsequent rapid spread. [See next preceding and next following Entries, 2643, 2645.]—*E. A. Bessey.*

2645. FOEX, ET. Note sur le piétin du blé. [Note on the foot disease of wheat.] Bull. Soc. Path. Vég. France 6: 52–54. May–June, 1919.—Two diseases of wheat are said to occur in France under this common name; one caused by *Leptosphaeria herpotrichoides* and the other by *Ophiobolus graminis*. The former fungus generally attacks the plant a certain distance above the soil and on one side, whereas the latter develops at the base of the culms and sometimes beneath the soil and surrounds the stems. Mature ascospores of *L. herpotrichoides* were first found August 15. From this time until May of the following year ascospores were found, thus providing material for infection of both winter and spring wheat. *Cercosporella herpotrichoides* was found associated with the Leptosphaeria and also with *Ophiobolus herpotrichus*. Its genetic connection with one or the other was suspected but not proved. Both species of *Ophiobolus* mentioned were found associated with the *Leptosphaeria* in some cases. The disease was found to attack oats as well as wheat. Spring sowing, rotation of crops especially with legumes, fertilization with nitrate of soda and sanitation are recommended for prevention. Application of 1000 kilos per hectare of iron sulphate was found very effective in preventing the disease. [See next two preceding Entries, 2643, 2644.]—*C. L. Shear.*

2646. FRANK, ARTHUR. Early fall spraying for apple anthracnose effective. Better Fruit 14¹: 7–8. July, 1919.—To prevent rotting of fruit from anthracnose (*Neofabraea malicorticis*) apple trees were sprayed early in the fall with Burgundy mixture, Bordeaux mixture 3:4:50, and lime-sulphur solution 1:40. The sprays were applied on September 24 and the stored fruit examined and final count taken on March 21. Best results were obtained with Bordeaux mixture followed closely by Burgundy. Spraying with either of these mixtures after the picking of fruit resulted in almost complete control of new infections on twigs and limbs of all treated trees.—*A. E. Murneek.*

2647. FROMME, F. D. The nematode disease of wheat in Virginia. Virginia Agric. Exp. Sta. Bull. 222. *18 p., 4 fig.* 1919.—This disease, caused by *Tylenchus tritici*, was first reported in Virginia in 1917, and is now known to occur in 33 counties. Distribution and severity of infection are shown by means of a table and map. The losses in a number of fields amounted to 25 per cent of the crop, and in one case exceeded 50 per cent. The greatest losses seem to occur in connection with consecutive wheat cropping. Symptoms, means of dissemination and control measures are described. In seed treatment tests it was found that a mechanical removal of galls from the seed was sufficient to insure freedom from infection from this source. This was most easily accomplished by skimming the galls off in salt brine. A close relation was found between the percentage of galls harvested and the percentage seeded. No marked differences in the susceptibility of the five varieties of wheat commonly grown in the State were found. Recommendations for control include the use of seed free from nematode galls and rotation.—*F. D. Fromme.*

2648. FUJIGURO, YOSABURO. A list of fungi on cultivated plants in Formosa. (Supplemental notes.) Bot. Mag. Tôkyô 32: (358)–(363). 1918.—A list of 100 host plants with fungi occurring on them.—*Anna E. Jenkins.*

2649. GAINES, E. F. Two important varieties of winter wheat. Washington [State] Agric. Exp. Sta. Popular Bull. 116. *7 p., 2 fig.* 1919.—See Bot. Abstr. 3, Entry 1866.

2650. GALLOWAY, B. T. Giant crowngalls from the Florida Everglades. Phytopath. 9: 207–208. *10 pl.* 1919.—Crowngalls caused by *Bacterium tumefaciens* were found on *Ficus aurea*. One weighing 97½ pounds is believed to be the largest recorded.—*F. R. Jones.*

2651. GENTNER, GEORG. Ueber durch Macrosporium sarciniforme Cav. hervorgerufene Erkrankungen der Luzerne und des Klees. [On a disease of lucerne and clover caused by Macrosporium sarciniforme.] Prakt. Bl. Pflanzenbau u. Schutz 16: 97–105. *2 fig.* 1918.—A leaf and stem disease of lucerne has been observed in Bavaria for several years increasing in infested fields and reducing the stand. Diseased leaves placed in moist filter paper pro-

duced spores of a *Macrosporium*, one of which was cultured. The spores of this *Macrosporium* differ slightly from those of *M. sarciniforme* on red clover, but spores from leaves of different varieties of lucerne also differ in measurement. The authnr concludes from morphological evidence that the fungus on lucerne is identical with that on clover. The culture of *Macrosporium* produced perithecia which were matured and identified as *Pleospora herbarum* Rabh. Observational evidence from seed germination tests indicates that the fungus is carried on the seed. Italian red clover and Turkestan lucerne are among the more susceptible varieties. —*Fred Reuel Jones.*

2652. González, Fragoso Rommaldo. **La roya de los vegetales. Enumeracion y distribucion geografica de los uredinales conocidos hasta hoy en la peninsula iberica e islas Baleares.** [Rusts of plants. List and distribution of the rusts of the Iberian peninsula including the Balearic Islands.] Trab. Mus. Nac. Cien. Nst. (Ser. Bot.) 15. *267 p.* Madrid, 1918.

2653. Great Britain. Board of Agriculture and Fisheries. **Insect and fungus pests of basket willows.** Bd. Agric. and Fisb. [London] Leafl. 301. *11 p., 4 pl.* 1918.—Brief populsr description of *Melampsora* sp. and *Botryosphaeria gregaria* snd their effect on host, with measures for control.—*Anna E. Jenkins.*

2654. Groseer, W. **Bericht über die Tätigkeit der Agrikulturbotanischen Versuchs- und Samenkontrollstation der Landwirtschaftskammer für die Provinz Schlesien zü Breslau wihrend der Zeit. von 1 April, 1917, bis 31 März, 1918.** [Botanical work of the experimsnt and seed control station at Breslau, 1917–18.] *18 p.* 1918.

2655. Grove, Otto. **Notes on the fruit blossom bacillus.** Ann. Rept. Agric. Hortic. Res. Sta. Univ. Bristol 1917: 21–24. 1918.—The fruit blossom bacillus, nams not given, has been found to he a fairly common inhabitant of the soil in April hut not in the 3 preceding months.—An organism has been found commonly ssociated with the roots of a variety of cultivated plants which corresponds very closely with the fruit blossom bacillus. Cultural characters are presented hut ths organism is not named. When used in sterilised soil germination of seeds of *Brassica* spp. was stimulated. No effect was observed when used in garden soil with a variety of vegetahles.—*D. Reddick.*

2656. Guinier, Ph. **Une invasion de Tramstes Pini Fr. dans une forêt de pin maritime.** [An invasion of Trametes pini in forest of Pinus pinaster Sol.] Bull. Soc. Path. Vég. France 6: 48–51. May–June, 1919.—A serious attack of the maritime pine by ths above fungus is reported from the south of France. In the forest of Arcs one-half to two-thirds of the trees are affected. Infection is said to take place through dead or hroken hrsnches and the unusual development of the trouhle is attrihuted to the humid atmospheric conditions prevailing in the region. The disease is much more prevalent in old trees than in young ones.—*C. L. Shear.*

2657. Harreveld, Ph. van. **Strepenziekte in hihittuinen.** [Stripe disease in nurseries.] Arch. Suikerindust. Nederlandsch- Indië 18: 919–922. 1919.—During the year an unusual occurrence of ths yellow stripe was noted in sugar cane nurseries both in the lowland and mountains and on varieties not hitherto affected. The unusual loss is ascribed to the great irregularity of the dry, west monsoon. The cause of the disease is unknown hut evidence indicates a close relationship between the rot of cuttings [cause unknown] and stripe disease. Nursery selection and the planting of only healthy cuttings reduced the disease.—*R. D. Rands.*

2658. Heinreicher, E. **Die Bedingungen, unter denen durch den Parasitismus der Zwergmistel (Arceuthobium oxycedri) auf Juniperus Hexenbesen entstehen können.** [Conditions under which witches' brooms are formed by the action of A. oxycédri.] Zeitschr. Pflansenkr. 28: 193–200. *3 pl.* 1918.

2659. HEMMI, TAKEWO. **Vorläufige Mitteilung ueber eine Anthracnose von Carthamus tinctorius.** [Preliminary report of an anthracnose of Carthamus tinctorius.] Ann. Phytopath. Soc. Japan 1²: 1–11. *2 fig.* 1919.—A disease of the stems, petioles and leaves of the safflower (*Carthamus tinctorius*) was observed in the experimental grounds at the University of Sapporo in July 1915, the cause of which was proved by infection experiments to be *Gloeosporium* (*Colletotrichum*) *carthomi* (Fukui) Hori and Hemmi, com. nov. This fungus was reported by T. FUKUI in 1916 as occurring on seedlings of *Carthamus tinctorius* under the name of *Marssonia carthami* Fukui, and is here referred to the genus *Gloeosporium* because the author found the spores to be one-celled.—*L. M. Massey.*

2660. HENNING, ERNST. **Anteckningar om den s. k. slidsjukan med anledning avdessen uppträdande a vete 1915 och 1918.** [Remarks about the so-called splitting disease and the cause of its appearance on wheat in 1915 and 1918.] Medd. Centralanst. försöksväsendet på Jordbruksomradet 175. Stockholm, 1918.

2661. HERMAN, V. R. **Soybeans and cowpeas for North Carolina.** North Carolina Agric. Exp. Sta. Bull. 24. *40 p.* June, 1919.—See Bot. Absts. 3, Entry 1368.

2662. HOLE, R. S. **Cause of the spike disease of sandal.** Indian Forester 45: 133–139. 1919.—Further notes on the disease are given.—*E. N. Munns.*

2663. HUMPHREY, HARRY B., AND AARON JOHNSON. **Take-all and flag smut, two wheat diseases new to the United States.** U. S. Dept. Agric. Farmers' Bull. 1063. *8 p. 3 fig.* 1919.

2664. HUNT, N. REX. **The iceless refrigerator as an inoculation chamber.** Phytopath. 9: 211–212. *Pl. 12.* 1919.—An inoculation chamber of the iceless refrigerator type is described and figured. Attention is invited to the possibilities which it offers for avoiding development of excessive temperatures in inoculation work.—*Geo. W. Keitt.*

2665. HURRY, JAMIESON B. **Plant diseases and the "vicious circle."** Jour. Roy. Hortic. Soc. 43: 309–315. 1919.—Any disturbance of the healthful cooperation of various organs in plants, may if severe enough lead to a condition of disease. Root starvation leads to inadequate supply of food for the leaves and this in turn to further root starvation. Often bacteria or fungi enter in as a part of the circle. The effect of circular inactions are discussed under three headings: (1) the perpetration of a pathogene, (2) the destruction of organs, (3) the termination of life. If the circle is broken at any point by corrective measures recovery may begin.—*J. K. Shaw.*

2666. HYDE, W. C. **Control of brown rot of stone fruits.** New Zealand Jour. Agric. 19: 24–26. 1919.—Lime-sulphur solution, self-boiled lime-sulphur, and Bordeaux mixture were the spray materials tested. Black leaf 40, and lead arsenate were used as needed to combat insects. The trees were inspected weekly and all twigs or fruits showing brown rot injury were destroyed. Bordeaux, seemed to give best results as an early spring spray while the self-boiled lime-sulphur was best for summer use.—*N. J. Giddings.*

2667. HYDE, W. C. **Orchard experimental work by Stoke fruit growers' association.** New Zealand Jour. Agric. 17: 225–230. 1918.—Lime-sulfur solution proved superior to atomic sulfur in spraying apples for the control of black spot [*Venturia inaequalis*]. Lime-sulfur as a foliage spray was used at a dilution 1:60 or weaker.—A first foliage treatment with Bordeaux mixture followed by applications of lime-sulfur solution gave excellent control with no indication of russetting.—Napthalene-lime-sulfur, a new combined fungicide and insecticide, gave promising results in apple orchards.—An experiment in scab control by turning under fallen leaves without subsequent cultivation gave a crop of apples 40 per cent of which have lesions, most of them very small [late].—An experiment for the control of brown rot of peaches is reported which indicates that early treatments of Bordeaux mixture are effective.—*D. Reddick.*

2668. Jensen, C. N. **Blossom infection by smuts.** Trans. Utah Acad. Sci. 1: 108–113. 1918.

2669. Johnson, M. O. [Soil investigation.] Hawaii Agric. Exp. Sta. Rept. 1918: 23–26. *Pl. 5.* 1919.—See Bot. Absts. 4, Entry 1663.

2670. Katsufuoi, Koichi. **"Yellow dwarf," a new nematode disease of soy bean.** Ann. Phytopath. Soc. Japan 1[2]: 12–16. 1919.—A disease of the soy bean (*Glycine hispida* Maxim.) called "yellow dwarf" is reported to be endemic in occurrence and of increasing importance in the vicinity of Date-mura in the Province of Ihuri (the southern part of Hokkaido). The disease was first observed by Professor S. Ito in the summer of 1915, who from observations concluded that it was due to a parasitic nematode. Affected plants are yellow and dwarfed, those slightly affected producing but few seed, while badly affected plants produce no seed. From morphological and biological characters it is concluded that the cause of the disease is *Heterodera schachti*. From information at hand it is considered that the disease is confined to the southern part of Hokkaido where the winters are comparatively mild. Observations lead to the conclusion that the kidney-bean and the Azuki-bean (*Phaseolus mungo* var. *subtriolata*) are also attacked. Varieties of the soy bean, Yoshioka and Oyachi, seemed to be the most resistant, while the varieties Kotsuhu and Meziro are the most susceptible. Incomplete experiments for control have given some promise from an economic standpoint.—*L. M. Massey.*

2671. Keller, G. N. **Tobacco growing in Ireland. The experiments in 1918.** Jour. Dept. Agric. Ireland 19: 298–302. 1919.—See Bot. Absts. 3, Entry 1372.

2672. Kimura, Noriyoshi. **The effect of X-ray irradiation on living carcinoma and sarcoma cells in tissue culture in vitro.** Jour. Cancer Res. 4: 95. 1919.

2673. K[irchner], O. [Rev. of: Fallada, O. **Zur Rübensamenbeize mit Schwefelsäure** (On treatment of mangel seed with sulphuric acid.) Mitt. Chem. Techn. Versuchsst. Zentralv. Rübenzuckerindust. Oesterreichs u. Ungarns Ser. IV, No. 79. Vienna. 1917.] Zeitschr. Pflanzenkrankh. 29: 55. 1919.—Since, during the war, Hitner's excellent method of treating beet seeds (fruits) with concentrated sulphuric acid could not be maintained, experiments were tried on the effect of treatment with less concentrated solutions. These indicated that sulfuric acid of 60° B. could not replace the concentrate, since the germinative energy is not nearly so stimulated as is the case with the concentrated acid. However, a method recommended by Mucha, viz.: to treat the seed in 53° acid, using a warm solution, gave commendable results, particularly after previous soaking for 6 hours in water.—*H. T. Güssow.*

2674. K[irchner], O. [Rev. of: Lüstner, G. **Ueber Ersatzmittel bei der Schädlingsbekämpfung im Weinbau.** (On substitutes in the control of vine pests.) Jahresb. Verein. Angew. Bot. 14: 87–94. 1916.] Zeitschr. Pflanzenkrankh. 29: 56. 1919.—Dusting against mildew with road dust, kaolin, gypsum, or cement is compared with the use of sulphur. Sulphur cannot under all conditions be replaced by neutral dusting compounds. Perozid may replace copper sulphate. Upsulun severely injures the green parts of grapes. Cuprou appears to be effective against *Peronospora*. Bordola paste acts the same as bordeaux and perosid mixture.—*H. T. Güssow.*

2675. K[irchner], O. [Rev. of: Lüstner, G. **Die Bekämpfung der Rebkrankheiten während des Krieges.** (The control of grape diseases during the war.) Mitt. über Weinbau u. Kellerwirtschaft. 1917. No. 3.] Zeitschr. Pflanzenkrankh. 29: 57. 1919.—For the control of Oidium, applications of sulphur, as well as so-called "war-sulphur," must be made in good time to be effective, i.e., once before and once after flowering, and later on as soon as signs of the disease are observed. Perosid mixture, prepared like bordeaux mixture, is as effective against slight attacks of *Peronospora* as the latter. *Botrytis cinerea* causes besides

rot of the grape, a stem rot and also injures leaves and shoots. The disease may be controlled by applications of nicotine soap emulsion as used against Sauerwurm (Cochylis), but being unobtainable during the war, all one could do was to provide good circulation of air in the vineyards.—*H. T. Güssow.*

2676. K[IRCHNER], O. [Rev. of: APPEL, O. **Die Blattrollkrankheit der Kartoffeln. (The leaf-roll disease of potatoes.)** Deutsche Landw. Presse 45. 1918. No. 14, with art supplement.] Zeitschr. Pflanzenkrankh. 29: 54. 1919.—Separating all diseases previously confused with leafroll (vascular, wilt, and diseases of the base of the stem), author discusses symptoms of true leafroll disease, represented by a colored plate. The cause has not yet been determined, but change of seed should be practised as control measure.—*H. T. Güssow.*

2677. KÖCH, G. **Ein für Oesterreich neuer schädling auf Picea pungens.** [A new disease on P. p. in Austria.] Oesterr. Gartenzeit. 13: 147–148. *1 fig.* 1918.—Buds curl up and are covered with black fructifications of *Cucurbitaria piceae*. Disease occurs also on *Pinus picea*. [From abst. by MATOUSCHEK in Bot. Centbl. 140: 202. 1919.]—*D. Reddick.*

2678. LAFFER, H. E. **Disease of the vine. Downy mildew (Plasmopara viticola).** Agric. Gaz. New South Wales 29: 581–584. 1918.—The disease has appeared lately in New South Wales.—Owing to climatic conditions it is not thought that the disease will be particularly serious, the current wet season being regarded as unusual.—*D. Reddick.*

2679. LAURITZEN, J. I. **The relation of temperature and humidity to infection by certain fungi.** Phytopath. 9: 7–35. 1919.—Pathogens and host plants used were *Puccinia graminis* var. *tritici* on *Triticum sativum*; *Ascochyta fagopyrum* on *Fagopyrum esculentum*; *Colletotrichum lindemuthianum* on *Phaseolus vulgaris*. A description of a double-walled humidity and temperature infection chamber in which the temperature could be maintained within 1° F., is given. The humidifying was accomplished by open pans of water or saturated salt solutions in combination with temperature manipulations.—*Puccinia graminis* showed a temperature range for infection of 42°–80° F.; a humidity range of 95–100 per cent relative humidity. *Ascochyta fagopyrum* showed a temperature range for infection of 45°–100° F.; a humidity range of 90–100 per cent. *Colletotrichum lindemuthianum* showed a temperature range for infection of 57–80° F.; a humidity range of 92–100 per cent.—A film of water covering the surface of the leaf is not regarded as essential for infection but plants with a dry surface show a narrower humidity range for infection.—*L. K. Bartholomew.*

2680. LEDEBOER, F. **Voorloopig bericht omtrent de verbreiding der Gomziekte.** [Preliminary report on the spread of gum disease.] Arch. Suikerindust. Nederlandsch-Indië 18: 956–961. 1919.—The spread of the disease was found to occur principally by means of the chopping knife in making the cuttings. In an extensive experiment where the knife was contaminated by first cutting diseased and thereafter healthy cane 94 per cent of the plants from the latter became diseased whereas there was only 0.3 per cent where the knife was not previously contaminated. No benefit was obtained when cuttings made with an infested knife were treated with tar or bordeaux mixture. Removal of all diseased nursery plants early in the season is recommended.—*R. D. Rands.*

2681. LEE, H. ATHERTON, AND E. D. MERRILL. **The susceptibility of a non-rutaceous host to citrus canker.** Science 49: 499–500. May, 1919.—Citrus canker is a disease recently introduced into the gulf states from Japan. At present, attempts are being made to eradicate the disease by burning trees on which infections are found, thus eliminating the sources of new infections. The senior writer has shown that citrus canker affects plants of a number of other genera of the Rutaceae. More recently inoculations with *Pseudomonas citri* on the lansones (*Lansium domesticum*) of the Meliaceae have produced swellings which later cracked. Eruption of tissues followed. The organism was reisolated. The results of the experiment warrant the statement that *P. citri*, upon stem tissue of *Lansium domesticum*, produces a reaction not evidenced in control inoculations. It is conceivable that a chain of

circumstances in the field might produce extreme optimum conditions that would lead to infection of highly resistant host plants which, under ordinary circumstances, would be regarded as immune. Lesions on such hosts then would be capable of serving as sources of reinfection to citrus plants.—*A. H. Chivers.*

2682. Leiby, R. W. **The spraying of Irish potatoes.** North Carolina Dept. Agric. Bull. 254: 5–38. *10 fig.* 1919.—This paper contains the results of five years' (1913–1918) experimental treatment to control insects and foliage diseases of Irish potatoes in North Carolina. Yields are shown from plots receiving no treatment to prevent diseases and injury from potato beetles in comparison with those which were sprayed with Bordeaux mixture, with Bordeaux mixture to which lead arsenate was added and with plots from which beetles were removed by hand picking.—*R. A. Jehle.*

2683. Leone, G. **Il marciume radicale degli agrumi nell'Oasi di Tripoli.** [A root rot of orange in Tripoli.] Agric. Colon. Firenze 12: 209–216. *4 fig.* 1918.—The first symptoms of the disease, stunted development, slight yellowing of the foliage, abundant flowering followed by dropping of flowers and fruit, and a partial, then complete loss of leaves, do not become evident until the root rot has reached an advanced stage. Upon examination roots appear blackened, soft, and spongy, with white patches of mycelium beneath the bark. Attacked trees are usually killed, so that the trouble is a serious menace to citrus cultivation in Tripoli. It is probably due chiefly to excessive irrigation and it is therefore advised that the water supply be reduced to the minimum requirement. Use of healthy stock for grafting, and of mineral rather than organic fertilizers are also recommended.—*E. K. Cash.*

2684. Liautard. **Preparation des bouillies cupriques et cupro-arsenicales.** [Preparation of copper and copper-arsenic sprays.] Prog. Agric. et Vitic, 69: 585–590. *2 fig.* 1918.—For use in vineyards of Algeria in the control of downy mildew and insect pests.—*D. Reddick.*

2685. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. June, 1919. [Serial no. 16.]—Parasitic fungi and animals found to decrease net photosynthetic activity of leaves. [See Bot. Absts. 3, Entries 1375, 1452, 2833.]—*B. E. Livingston.*

2686. Mangin, L.—**Action nocive des émanations de l'usine de Chedde sur la végétation.** [The injurious effect of gasses from the Chedde factory on vegetation.] Bull. Soc. Path. Vég. France 5: 104–108. 1918. [Issued April, 1919.]—Injury to various trees growing in the vicinity of a munitions factory in the Alps is reported. The gasses given off contain chlorine which is said to combine with the vapor in the air, finally producing hydrochloric acid. This reaches the foliage in the dew or fog and thus causes injury. Most of the frondose trees show little or no injury except in the immediate vicinity of the factory. The aciculose trees showed most injury. *Epicea* is particularly sensitive and killed in four to six years. *Abies* and *Pinus* are also badly injured. The greater injury to such foliage is attributed to the fact that most of the fogs in the region occur in autumn, winter and early spring when the foliage has fallen from the deciduous trees.—*C. R. Shear.*

2687. Mangin, L. **Sur le dépérissement des Epicea dans la vallée de l'Arve (Chedde et Chamonix).** [The death of spruces in the Arve Valley.] Compt. Rend. Acad. Agric. France 5: 195–204. *5 fig.* 1919.—This is the full paper, of which a discussion (by Mangin, Vincey, Haller, and Henneguy) appeared elsewhere. [See Bot. Absts. 3, Entry 1179.] According to this author, beginning at the tips of the twigs the foliage turns yellow, then dies and falls off. No leaf, stem or root parasites are present. The suspicion that was expressed in the discussion, that this was due to chlorine fumes, seems unfounded since it is also present in other valleys where factories are absent. Apparently a physiological trouble, probably bearing some relation to the dryness of the soil and the altitude of the locality.—*E. A. Bessey.*

2688. MANN, HAROLD H., AND S. D. NAGPURKAR. **Notes on the "ring disease" of potato.** Agric. Jour. India 14: 388–394. 1919.—The ring disease, a bacterial wilt (organism not named), of the potato is the greatest enemy of the potato in the potato tract of the Bombay Presidency. The bacteria produce a sudden wilting of the plant and the diseased tubers show a brown ring in the vascular tissues, commencing, as a rule, near the point of attachment of the tuber to the plant, but spreading around the whole tuber. The infection occurs in the lower part of the stem in which the ring can usually be seen. Often 20 to 80 per cent of the plants in a plot die of the disease. Experiments conducted show that the disease is extremely infectious and may be spread even by the knife used in cutting the sets. The organism usually is conveyed from crop to crop through the seed and the soil. Infestation in the soil may be reduced by 75 per cent if the soil is allowed to lie idle for 2½ months and entirely disappears after 5 or 6 months. Disease free seed is the best means of eradicating this fatal disease.—*F. M. Scherz.*

2689. MASSA, C. **Una teleforacea dannosa al laccio (Stereum gausapatum Fr.).** [**Stereum gausapatum injurious to holm-oak.**] Ann. R. Ist. Sup. For. Naz. Firenze 3: 1–31. *3 pl., 11 fig.* 1918.—Fruiting bodies of the fungus have been observed in the vicinity of Florence on the trunks and branches of holm-oaks planted in hedges, which frequently become weakened by excessive and irregular pruning. The organism is considered a facultative parasite, occurring commonly as a saprophyte on fallen branches and on stakes and supports for hedges made from the wood of holm-oak. The injury caused to the host is serious, resulting in death if the plant is in a weakened condition. Examination of an affected trunk shows a characteristic alteration of the wood. Detailed study has been made of the organism and its relation to dead and living tissues of the host. It will be necessary to secure further confirmatory data and to obtain the characteristic pathological symptoms of the disease on healthy trees in order to prove conclusively that they are caused by the mycelium of the fungus. Suggestions for control include protection of wounds with tar, care to avoid excessive pruning, use of healthy young trees in starting hedges, and of sound wood treated to protect it from infection for posts and supports, and the removal of dead wood and diseased trees.—*E. K. Cash.*

2690. MATOUSCHEK. [Rev. of: GERTZ, O. **Makrokemiska lgghvlteprof å blad.** (**Macrochemical tests of leaves.**) Bot. Not. 1917: 1–35.] Zeitschr. Pflanzenkrankh. 29: 51–52. 1919.—The analysis of calico or albinism in leaves showed correlation between positive albumin reaction and increase in green colour of leaves. The white portions showed no reaction. The reaction is due to the amount of chlorophyll contents increasing the albumin. In barley strains discussed by NILSSON-EHLE, which showed presence or absence of chlorophyll, the reaction was positive in the former, but negative in the latter. The investigations agree largely with the work of LAKON [Biochem. Zeitschr. 78. 1916.] on the albumin contents of albino leaves.—*H. T. Güssow.*

2691. MATOUSCHEK. [Rev. of: HEYDE, G. v. D. **Frostwirkung an Buxus sempervirens Handworthii.** (**Effects of frost on Buxus sempervirens Handworthii.**) Mitteil. Deutsch. Dendrol. Ges. 1917: 235–236.] Zeitschr. Pflanzenkrankh. 29: 54. 1919.—Early in 1917 there occurred in Dortmund, low temperatures ranging down to −16°C. The leaves of the above mentioned shrub were swollen to a thickness of 4.7 mm. The ice in the interior of the leaf was easily removed together with the lower leaf surface. Exposed to +10°C. this lower epidermis would easily peel away from the ice skeleton, leaving a clear impression of the leaf nervature behind.—*H. T. Güssow.*

2692. MATOUSCHEK. [Rev. of: KÜSTER, ERNST. **Ursachen und Symptome der Unterernährung bei den Pflanzen.** (**Causes and symptoms of malnutrition in plants.**) Naturwissenschaften 5: 665–669. 1917.] Zeitschr. Pflanzenkrankh. 29: 52–53. 1919.—Lack of nutritive salts or carbon dioxid cause malnutrition in plants. At times these substances may be available, but for some reason or other the plant is not able to make use thereof. Such reasons include: injury or parasitic attacks of the root system, anomalies in metabolism,

overhumid atmosphere, weakening through parasites. There results a reduction of the somatic mass (nanism, japanese dwarf trees, etc.). There occurs besides a reduction in the growing period, the plant hastens towards completion of its development, and often produces abundance of flowers (dwarf fruit trees), when it may eventuate in a process of "sich zum Tode blühen" [blooming itself to death]. Opposed to the above occurs reduction in organs (leaves, petals, and anthers; for instance, in poppy). Finally malnutrition may cause reduction in diversity of organs. In *Zea mais* there may occur only staminate flowers; fern prothallia produce only male sexual organs. (There occurs, so to say, spaying) On the other hand, cleistogamous flowers may develop (*Impatiens*). The struggle of the parts within an organism is really a battle for the available nutritive substances. Upon this depends the physiological malnutrition (sterility, latency of buds for decades). Malnutrition is important in the development of each single organ, as well as for the general habit of the plant. Norwithstanding physiological compulsion to permanent new production of organs, long lived plants will only reach a certain dimension, and live to an average age. When the distance from earth to crown is too long, there results a reduction in the crown—the tree ages.—*H. T. Güssow.*

2693. Matouschek. *[Rev. of: Markowski, A. **Botrytis cinerea als Parasit auf Aesculus parviflora Walt. und Aesculus Hippocastanum.** (Botrytis cinerea parasitic on Aesculus parviflora and Ae. Hippocastanum.) Beitr. Biol. Pflanzen. 13. *347 p.* 1917.] Zeitschr. Pflanzenkrankh. 29: 65–66. 1919.

2694. Matouschek. [Rev. of: Neumann, O. **Absterben durch elektrischen Strom.** (Dying through electrical current.) Mitteil. Deutsch. Dendrol. Ges. 1917: 237.] Zeitschr. Pflanzenkrankh. 29: 54. 1919.—A robust linden tree at Naumburg a/S. grew in proximity to a high voltage pole. During thunderstorms in 1916 the electrical earth currents circulated through the branches towards a lightning conductor with which the pole was equipped, giving rise to audible hissing. The tree gradually died.—*H. T. Güssow.*

2695. Matouschek. [Rev. of: Rebmann. **Absterbende Schwarznüsse.** (Dying of walnuts.) Mitt. Deutsch. Dendrol. Ges. 1917: 109–114. *3 fig.*] Zeitschr. Pflanzenkrankh. 29: 53–54. 1919.—Dying and dead walnut trees occur in the forests of the Rhine near Strassburg. Author considers as cause soil conditions, water conditions, and the dense stand of trees. Suggests periodical thinning of stand by cutting over.—*H. T. Güssow.*

2696. Matouschek. [Rev. of: Rudau, Bruno. **Vergleichende Untersuchungen über die Biologie holzzerstörender Pilze.** (Comparative studies on wood destroying fungi.) Beitr. Biol. Pflanzen. *p. 375–458, 6 pl.* 1917.] Zeitschr. Pflanzenkrankh. 29: 63–64. 1919.—*Polyporus igniorius* on the following new hosts: *Ulmus compestris, Prunus cerasifera, Hippophae rhamnoides.* Forms of rots were studied on species of *Betulo, Salix, Populus, Pirus,* and *Prunus.* Is a typical wound parasite.—*H. T. Güssow.*

2697. Matouschek. [Rev. of: Schwerin, Fritz, Graf v. **Blasenrost auf Pinus austriaca.** (Blister rust of P. austriaca.) Mitt. Deutsch. Dendrol. Ges. 1917: 212.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.—Record of this rust on single tree on Roman road near Epoy, Belgium, where, for large distances around, *Pinus strobus, Ribes,* or *Berberis* cannot be found. —*H. T. Güssow.*

2698. Matouschek. [Rev. of: Vadas, Eugen. **Die Monographie der Robinie mit besondrer Rücksicht auf ihre forstwirtschaftliche Bedeutung.** (Monograph of Robinia with special regard to its significance in forestry.) *xiv + 252 p. 10 ort prints, 30 text fig., 14 tables.* Selmecbánya, 1914.] Zeitschr. Pflanzenkrankh. 29: 49. 1919.—The seventh section of above publication deals with the enemies of *Robinia,* and with protective measures against them. Among the vegetable parasites are mentioned *Viscum album; Nectrio cinnabarina,* affecting in one case 33 per cent of plants following injury with the hoe; *Phytophthora omnivora* in seedlings; *Polyporus sulphureus,* causing a dry wood rot; *Pseudovalsa profusa* on young twigs and on leaves; *Septoria robiniae, S. curvata,* etc. Robinia is rarely injured by spring frosts. Fall frosts kill the twigs without injury to the tree.—*H. T. Güssow.*

2699. MATOUSCHEK. [Rev. of: WINGE, Ö. Stikkelsbaerdraeberen giftig? (Ist der Stachelbeermehltau giftig?) (Is gooseberry mildew poisonous?) Medd. fra foren. til Svampek. Fremme I. 108–111. 1915.] Zeitschr. Pflanzenkrankh. 29: 64. 1919.—No.—*H. T. Gussow.*

2700. MCCUBBIN, W. A. Notes on diseases in 1918. Agric. Gaz. Canada 6: 433-436. 1919.—Brief notes on diseases in Ontario, as follows: winter injury of apples; petiole infection of *Platanus americana* by *Gnomonia veneta;* tomato fruit rot caused by *Asbochyta* sp., *Pyropolyporus ribis* affecting red currants; *Pelargonium* affected with a vascular trouble thought to be caused by *Verticillium;* rot of cucumber fruits caused by *Rhizopus nigricans;* girdling of peach trees in the nursery attributed to *Sclerotina cinerea;* lightning injury to tomatoes; leaf spot of peach caused by *Bacterium pruni;* silver leaf of plums and peaches possibly due to mite infestation.—*D. Reddick.*

2701. MERCIER, C. A. The electrification of seeds. Sci. Amer. 120: 142–143. 6 *fig.* 1919.—See Bot. Abets. 4, Entry 104.

2702. MERCER, W. B., AND S. P. MERCER. Smut diseases of barley and oats. Jour. Bd. Agric. [Great Britain] 25: 1486–1493. 3 *fig.* 1919.—Popular descriptions are given with notes on the life history, prevalence in England, and treatment for control of the following smut diseases: barley, loose smut (*Ustilago nuda*), and covered smut (*Ustilago hordei*); and oats, loose smut (*Ustilago avenae*), and covered smut (*Ustilago levis*). Brief mention is made of stinking smut (*Tilletia separata*) and leaf smut (*Urocystis occulta*) of rye.—*M. B. McKay.*

2703. MCCUBBIN, W. A. Brown rot of stone fruits. Agric. Gaz. Canada 6: 429-432. 1919.—A census made in 1918 in plum, peach and cherry orchards of southern Ontario of the occurrence of *Sclerotinia cinerea* and of the lesions caused by it. Apothecial clusters, varying from 1 to 111 cupa per cluster, were found on a given date as follows: plum 4.1 clusters per tree; peach 5.1 clusters. At a later date clusters were found in 1 orchard to average 26.3 per tree.—Blossom infection occurred in cherries to the extent of 10.2 per cent, in plums, 6.4 per cent and peaches, 2.6 per cent.—Twigs aborted by *Exoascus deformans* were found to harbor the fungus to the extent of 70.5 per cent. Considerable significance is attached to this particularly as the conidia are developed abundantly on such twigs whereas cankers rarely bear conidia.—In the autumn the percentage of plums affected with rot was 7.9, of peaches 2.9 per cent.—The average percentage of rotten plums found on the market was 8 per cent and of peaches 8.5 per cent. Dealers reported this as "almost none."—A dusting experiment for the control of rot was without results owing to the small amount of disease present.—*D. Reddick.*

2704. MELANDER, A. L. Dry lime-sulphur as compared to liquid. Better Fruit 14: 10. 1919.—The chemistry, value, cost, and convenience of handling of dry lime-sulphur, as compared to the liquid form, is considered in a practical way. Unless dry lime-sulphur is boiled, the liquid form is preferable.—*A. E. Murneek.*

2705. MIÈGE, EM. La desinfection du sol. [Disinfection of soil.] Ann. Serv. Épiph. 5: 83–144. 1918.—Extensive review of the literature of soil disinfection touching the following points: presence and persistence of animal and plant parasites and of toxins in soil, method of soil contamination, influence of disinfection on soil and parasite and on weeds. Experiments were performed at Rennes and at Paramé with a large number of antiseptics and with several different vegetables. Parasites are not named but the poor condition of untreated plots as compared with certain treated ones is attributed to the action of plant and animal parasites. Tables are presented to show the yields from the various plots. It is recognized that the chemicals employed may act as fertilizers as well as disinfectants.—Literature on accessory practices is reviewed and includes disinfection of seed, prevention of recontamination, use of resistant varieties, etc.—Theoretical considerations underlying the practice are discussed at length.—*D. Reddick.*

2706. Ministère de l'Agriculture. **Rapports sommaires sur les travaux accomplis dans les laboratoires et comptes rendus des missions d'études. [Summaries of the entomological and pathological work accomplished and a list of projects.]**—Ann. Serv. Épiph. 5: 253–272. 1918.—Pathological reports by Arnaud (Paris) and Capus (Cadillac). The latter contains notes on downy mildew and black rot of grapes, experiments with lime-sulfur solution for the control of powdery mildew (*Oidium*) of grapes, and notes on a disease of walnut caused by *Armillaria mellea*.—*D. Reddick.*

2707. Molz, E. **Über die Züchtung widerstandsfähiger Rebsorten. [Breeding disease resistant grapes.]** Jahrb. Deut. Landw.-Ges. 33: 166–199. 1918.

2708. Munn, M. T. **Seed-borne plant diseases.** Seed World, 5[16]: 20–21. 1919.—An outline is given of the methods pursued in studying the fungous infection of seeds. The binocular microscope and the centrifuge were utilized, also, the centrifuge washing water and sediment were examined under the compound microscope for the spores or remains of fungi. Observations and tests which are cited demonstrate that many points concerning the health of the seeds can be determined in the seed laboratory. While it is not an easy matter to determine whether or not a lot of seed is free from fungous infection, the methods described were of considerable value in making the determinations.—*M. T. Munn.*

2709. Mueeill, W. A. Collecting fungi in Virginia. Mycologia 11: 277–279. 1919.

2710. Müller, H. C., and E. Molz. **Versuche mit Saatschutzmitteln. [Investigations with seed protectives.]** Landw. Jahrb. 52: 67–130. 1918.—Investigations, covering 5 years, of the protective value of various materials for seed treatment against rodents and other animals and against smut of wheat and leaf stripe of barley and of the effect of the treatments on vitality of the seed. A large number of standard and proprietary materials were tested.—*D. Reddick.*

2711. Nash, G. V. **Injury to evergreens.** Jour. New York Bot. Gard. 19: 48–50; 159–161. 1918.—Winter injury.

2712. Neger, F. W. **Die Blattrollkrankheit der Kartoffel. [The leafroll disease of the potato.]** Zeitschr. Pflanzenkrankh. 29: 27–48. 7 *fig.* 1919.—Contribution to the etiology of the disease and to the physiology of the potato plant in general, following a preliminary note in Deutsche Landw. Presse No. 76: 1918. Author discusses the translocation of starch in sound and leafroll diseased potatoes, and is of opinion that the starch accumulation in leafroll diseased leaves stands in closest relation to the degree of leafrolling. There cannot exist any doubt that starch accumulations and rolling of leaves are coincident, yet this does not prove these phenomena to be causally related; both indeed may constitute symptoms caused by a third factor, as yet unknown. Nevertheless, excess of starch may be the primary, and the rolling of the leaf the secondary factor, yet it is not clear how the former would cause the leaf to curl. The investigations continue with an inquiry into the causes of starch accumulations. It is suggested that, coincident with the excess of starch in diseased leaves, there occurs an accumulation of diastase; both factors would indicate the serious disturbance of the enzymatic processes within the plant, but as to cause and origin of which no clear vision has yet been reached. The investigations are summarized as follows: As a rule translocation of starch does not occur readily in leafroll diseased leaves, only under optimum growth conditions a translocation occurs of the excess of starch, provided, however, that the discoloration present in the unsound leaves has not progressed too far. The ability to discharge the normal starch contents (Bildungsstärke) at comparatively low temperature (10° C.) differs in varieties, indeed often in individuals. Generally speaking, even the sound leaves of leafroll susceptible varieties discharge sluggishly these starch accumulations at a temperature of 10° C. (Important in relation to seed approval.) Translocation occurs the more readily the more vigorously the leaf is aerated. Leafroll diseased leaves contain much more diastase than sound leaves. That starch is not dissolved is apparently due to the accumu-

lation of split products of starch (Spaltungsprodukte) as sugar, through the presence of which the amylolytic enzyme is rendered inactive. In leafroll disease of other plants, especially so in lilac, the abnormal starch accumulations also occur.—*H. T. Güssow.*

2713. NEWELL, WILMON. Citrus canker eradication in the State of Florida. California Citrograph 4: 313, 323. 1919.—Paper read at Horticultural Convention at Riverside, Calif. May, 1919.

2714. N[OWELL], W. [Rev. of: ASHBY, S. F. Bud-rot disease of coconuts. Jour. Jamaica Agric. Soc. 22: 331–333. 1918.] Agric. News [Barbados] 17: 286–287. 1918.

2715. NOWELL, WILLIAM. Root disease of coco-nut palms in Grenada. Agric. News [Barbados] 17: 398–399, 414–415. 1918.—Thought to be caused by nematodes.—*D. Reddick.*

2716. NOWELL, W. Investigation of the froghopper pest and disease of sugar-cane. Agric. News [Barbados] 18: 174, 175, 190, 191, 206, 207, 222. 1919.—The author describes the condition known as blight occurring in sugar-cane fields in Trinidad. Hitherto this condition was supposed to have been brought about entirely by the attacks of the froghopper (*Tomaspis saccharina* Distant). Recently, however, C. B. WILLIAMS found from his studies of the problem that this pest could not account for all the so-called blight. It now appears from the author's co-operative work, along mycological lines, that the root disease, caused by fungi of the *Marasmius* and *Odontia* groups, is an important factor in the Trinidad problem and is causing a great deal of the damage which has been attributed to the froghopper. The nature of root disease is described, and the factors influencing it, soil conditions, remedial measures, sanitation, rotation, ratooning, manuring, etc., are fully discussed.—*J. S. Dash.*

2717. NOWELL, W. Mycologist's report on a visit to Trinidad. Proc. Agric. Soc. Trinidad 19: 141–159. 1919.—A discussion of the root diseases of sugar cane in connection with the injury done to the plants by the froghopper. Remedial measures suggested are better cultivation, sanitation, rotation of crops, and the selection of good seed canes.—*J. B. Rorer.*

2718. PADRÓN, ANDRÉS. Tratamientos insecticidas y anticriptogamicos de las plantas cítricas. [Spraying citrus trees.] Revist. Agric. Com. y Trab. 2: 388–390. *2 fig.* 1919.

2719. PAMMEL, L. H. The extermination of the common barberry to prevent crop loskage due to stem rust. Rept. Iowa State Hortic. Soc. 53: 401–408. 1918.—Gives a brief account of barberry, its relation to stem rust of grass, *Puccinia graminis*, and the history of the movement that led up to its extermination. A comparison of the common barberry (*Berberis vulgaris*) and Japanese barberry (*B. thunbergii*).—*L. H. Pammel.*

2720. PAMMEL, L. H. Recent literature on fungous diseases of plants. Rept. Iowa State Hortic. Soc. 53: 185–225. 1919.

2721. PARKER, R. C. Testing seed potatoes on Long Island. Potato Mag. 2[1]: 8, 22–23; 2[2]: 19, 27–28. *1 fig.* 1919.—Considers mosaic, potash deficiency, and leaf roll.—*Donald Folsom.*

2722. PATER, B. Bericht über das Arzneipflanzenversuchsfeld der landwirtschaftlichen Akademie in Koloszvár. [Report on the experimental field of medicinal plants of the agricultural college in K.] Part 3. *53 p., 3 fig.* Koloszvár, 1918.—Henbane (*Hyoscyamus*) was ruined by an attack of mildew (*Erysiphe cichoriacearum*) although wild plants were slightly affected. *Ascochyta hyoscyami* caused brown leaf spots and stem lesions in 1916.—Notes on insect enemies and cultural conditions. [From abstracts by MATOUSCHEK in Zeitschr. Pflanzenkr. 29: 106–107. 1919.]—*D. Reddick.*

2723. Pavarino, L., and M. Turconi. **Sull' avvizzimento delle piante di Capsicum annuum L. [A wilt of Capsicum annum.]** Atti Ist. Bot. Univ. Pavia II, 15: 207–211. 1918.—New studies are reported on a wilt and rot disease of *Capsicum annuum* previously studied by Noelli and L. Montemartini and by the latter attributed to *Fusarium, vasinfectum*. A new species of *Bacillus* (*capsici*) was isolated from affected portions of plants. The bacteria were found in newly affected portions of the plant where the *Fusarium* was not found. Successful inoculations from pure cultures were made by spraying. The *Bacillus* is described.—*F. M. Blodgett.*

2724. Pavarino, G. L. **Alcune malattie delle orchidee causate da bacteri. [Some bacterial diseases of orchids.]** Atti Ist. Bot. Univ. Pavia II, 15: 81–88. *Pl. 13.* 1918.—Bacteria were isolated from lesions on various orchids. The diseases were reproduced by subepidermal inoculation. Five new species are described as follows: *Bacterium cattleya* from *Cattleya warneri* and *C. harrisoniae; Bact. krameriani* from *Oncidium krameranum; Bact. briosianum* from *Vanilla planifolia; Bacillus farnetianus* from *Oncidium ornithorhynchum* and *Cattleya crispa; Bacillus pollacii* from *Odontoglossum citrosmum.*—*F. M. Blodgett.*

2725. Peltier, George L. **Snapdragon rust.** Illinois Agric. Exp. Sta. Bull. 221: 535–548. *5 fig.* 1919.—Snapdragon ruet, *Puccinia antirrhini*, "was reported first in this country in 1903 by Blasdale" from California. At the present time it is found practically wherever snapdragons are grown under glass. The fungus attacks seedlings, cuttings and mature plants both outdoors and in the greenhouse. It is confined to a single species of the genus, *A. majus*. All varieties of the species seem equally susceptible.—From results of experiments, the author concludes "that the fungicides used will neither prevent, check, nor control snapdragon ruet in the greenhouse; it can be further concluded that by watering the soil only, in the bench, and avoiding all syringing, the disease can be held in check better than by the use of fungicides."—Ruet is not carried by snapdragon seed, though the lattter be taken from infected seed pods. The disease can, therefore, be eliminated by the propagation of plants from seed.—*P. A. Lehenbauer.*

2726. Peltier, George L. **Carnation stem rot and its control.** Illinois Agric. Exp. Sta. Bull. 223: 579–607. *5 fig.* 1919.—The symptoms, cause and control measures of carnation stem rot. The disease, caused by *Rhizoctonia solani* (*Corticium vagum*), is responsible for an annual average loss of carnation plants of 2.2 per cent in the greenhouse and 3.25 per cent in the field. Manures, commercial fertilizers and acidity or alkalinity of soil have little influence on growth of fungus. Soil disinfectants such as sulfuric acid, formalin, bordeaux, and copper sulfate are of little value in the control of the disease. Steam sterilization will eradicate the fungus from soil, but upon transplanting carnation plants from field into benches containing sterilized soil the fungus may be again introduced. The disease follows closely temperature and moisture conditions and infection seems to be controlled primarily by the existing soil temperature. Since the optimum temperature for the growth of carnation plants is relatively low (50° to 62° F.) and the optimum temperature for the growth of the fungus relatively high (approximately 86° F.) control measures lie in "a careful watch of the growing conditions of the plants."—*P. A. Lehenbauer.*

2727. Pethybridge, G. H. **Investigations on potato diseases.** Jour. Dept. Agric. Ireland 19: 271–292. *8 fig.* 1919.—Discusses the 1918 Ireland crop of potatoes (*Solanum tuberosum*) with special regard to blight (*Phytophthora infestans*) and fertilizer malnutrition. One per cent and 2 per cent Burgundy mixtures have proved of equal value for the control of blight; four applications are profitable; their effect upon yields of resistant varieties varies; they are better when the stronger forms of sodium carbonate are used. Some varieties are resistant to blight but none, so far, to pink rot (*Phytophthora erythrosseptica*). Disinfection with mercuric chlorids, formaldehyde, and heat, effective against silver scurf (*Spondylocladium atrovirens*) killed the tubers, the first agent also spotting them at the lenticels. Heating tubers did not produce leaf roll (organism unknown). Pit-rot has been found in Ireland since 1909 and in England on tubers from storage pits, being characterised by hemispheres

of dead tissue. These appear externally as dark pits from 0.3 to 2.5 cm. in diameter and with a lenticel or eye in the center. As they become drier and harder they change from brown to blackish gray. Further description is given together with results indicating that a toxic gas or liquid is the cause.—*Donald Folsom.*

2728. PETRI, L. **Studi sulla malattia del castagno detta "dell'inchiostro." Morfologia e biologia del micelio parassita.** [Morphology and biology of the organisms causing the ink disease of chestnut.] Ann. R. Ist. Sup. For. Naz. Firenze 3: 151–185. *4 pl., 16 fig.* 1918.—The causal organism (*Blepharospora cambivora*) is classified in the order Saprolegniae. The production of spores occurs in nature only in the water moistening the humus around the roots of the trees, while cultures were found to fruit in dilute solutions of nutritive mineral salts. Formation of oospores has been observed only in infected tissues of germinating seedlings. The disease is carried from one tree to another in the same grove by means of rains and streams washing the soil, but may be disseminated to a great distance through oospores carried by the wind. Artificial inoculation clearly demonstrates the parasitic nature of the disease, showing that the organism can attack the roots and the basal portion of the trunk of trees in all stages of growth. The relative ease with which the mycelium of the fungus attacks the living tissues of chestnut indicates that conditions predisposing the tree toward infection may be regarded as negligible. Humidity and mild temperature in winter and spring are the principal conditions favorable to the appearance of the disease.—*E. K. Cash.*

2729. POLE EVANS, I. B. **[Report of the] Division of botany.** Rept. Dept. Agric. Union South Africa 1917–18: 61–68. 1918.—Pathological report (p. 65–68) deals with the organization work for the eradication of citrus canker.—Brief statement of the problems under investigation by members of the staff.—*D. Reddick.*

2730. PRUNET, A. **Le black-rot et son traitement.** [Black rot of grape and its control.] Prog. Agric. et Vitic. 69: 533–545. 1918.

2731. RAMÍREZ, ROMÁN. **Enfermedad grave de la caña.** [Serious disease of sugar cane.] Revista Agric. [Mexico] 4: 348–349. *2 fig.* 1919.—*Thielaviopsis paradoxa* (black rot or pineapple disease) reported as causing loss in Yellow Caledonia cane in Mexico.—*John A. Stevenson.*

2732. RANDS, R. D. **De bruine binnenbaatziekte van Hevea brasiliensis. (Voorloopige mededeeling.)** [The brown bast disease of Hevea brasiliensis.] Arch. Rubbercult. Ned.-Ind. 3: 156–159. 1919.—In this disease a brownish gum is found in the diseased tissue in the intercellular spaces between the parenchyma, sieve tubes, or latex vessels of the bark. In severe cases it is also found in latex vessels near the cambium. By its behavior toward oxidising agents and its staining reactions it is shown to be one of those gums that serve the purpose of "wound stoppage." No causative organism present but experiments show that the *Hevea* tree responds to most wounds extending to or near the cambium by the secretion of the brown gum. It appears therefore that brown bast is an accentuated condition of gum secretion probably resulting from the response on the part of the tree to the present methods of tapping.—*W. E. Cake.*

2733. RAVAZ, L. **Nouveau essais de traitement contre le mildiou.** [Recent studies on grape downy mildew control.] Prog. Agric. et Vitic. 69: 313–315, 361–363. 1918.

2734. RAVAZ, L. **Ce qu'il faut connaitre du mildiou. Regles a suivre pour le combattre.** [Downy mildew of grapes and its control.] Prog. Agric. et Vitic. 69: 457–466. 1918.

2735. REDDICK, DONALD, AND STEWART, V. B. **Additional varieties of beans susceptible to mosaic.** Phytopath. 9: 149–152. 1919.—In addition to tests mentioned in Phytopath. 8: 530–534, 1918 the following varieties have been tested in the field and found susceptible: *Phaseolus vulgaris*, black-eyed wax, and 25 other varieties; *Phaseolus lunatus macrocarpus*, long pod; *Phaseolus acutifolius latifolius*, Tepary; *Vicia faba*, horse bean, and winter horse

bean. Eight Manchurean beans were also found susceptible. No mosaic developed in any plots of variety Robust. The following varieties and related species are immune or highly resistant to mosaic: *Dolichos lablab*, hyacinth; *Cicer arietinum* Garbanzo; *Vigna sinensis*, black-eye; *P. aconitifolius*, moth bean; *P. aureus*, Mung bean; *Canavali ensiformis*, Jack bean. These may be used for breeding resistant varieties.—*R. E. Vaughan.*

2736. Reimer, F. C. **A new and effective disinfectant for pear blight.** Better Fruit 13[10]: 24–27. Apr., 1919. [Also published in: Monthly Bull. State Comm. Hortic. (California) 7: 562–565. 1918. (See Bot. Abstr. 2, Entry 535.)]

2737. Reinking, Otto. **Philippine plant diseases.** Phytopath. 9: 114–140. 1919.—The author has made a survey of fungous diseases on the island of Luzon (Philippine Islands). Climatic conditions are especially favorable for the development of fungous pests and the native farmers are ignorant of control measures. The coffee industry has been entirely wiped out by a disease; coconut, rice, sugar, and citrus industries are also hampered and the culture of all vegetables complicated by various diseases. The estimated loss averages about 10 per cent for all crops.—A list of 48 of the principal cultivated and wild hosts of the Launa Province, Luzon, is given, together with the relative importance of the crop and the names of the diseases which are destructive to them. A short description of each disease is given, together with the name of the causal organism. Many of these organisms have never been described, but the more common hosts are attacked by those parasites which are prevalent upon them in other countries. The citrus trees are attacked by canker (*Bacterium citri*), die-back, and gummosis, coconuts suffer most from bud rot (cause not determined), leaf spots, and sooty mold, while the most destructive coffee disease is rust (*Hemileia vastatrix*). On the tomatoes are found bacterial wilt (*Bacillus solanacerum*), late blight (*Phytophthora infestans*) and damping off (*Pythium de baryanum*).—Bacterial diseases seem particularly severe, especially bacterial wilt of potato, egg plant and tomato and bacterial blight of beans. —*Maude Miller.*

2738. Rhoade, Arthur S. **The biology of Polyporus pargamenus Fries.** New York State Coll. Forestry Tech. Publ. 11. *197 p., 31 pl., 6 fig.* 1918.—See Bot. Abstr. 3, Entry 2497.

2739. Rodda, T. E. **Brown rot experiment at Arataki.** Jour. Agric. [New Zealand] 16: 222–228. 1918.—Spraying experiment, fractional in part, but also designed to test relative value of a number of fungicides. Some trees sprayed four times showed a higher percentage of rot than the unsprayed ones. "The weight of evidence is in favor of the sulfur compounds."—Similar trials on apricots showed that Bordeaux mixture gave the best control of rot but because of discoloration of fruit should give way to lime-sulfur solution 1: 130. —Rust was controlled satisfactorily by all the fungicides used.—*D. Reddick.*

2740. Rodda, T. E. **Control of red mite and black-spot.** New Zealand Jour. Agric. 18: 344–347. *Pl. 1.* 1919.—Oil, 1: 30, used when buds were in advanced pink stage was very effective against red mite. Bordeaux, 6: 4: 50, was much better than lime-sulphur solution for the control of black spot, *Venturia inaequalis*, but caused considerable fruit russeting and is therefore not recommended. Oil was used on the same trees as the Bordeaux.—*N. J. Giddings.*

2741. Rose, D. H. **Blister canker of apple trees: a physiological and chemical study.** Bot. Gaz. 67: 105–146. Feb., 1919.—See Bot. Abstr. 4, Entry 1546.

2742. Rosen, H. R. **A bacterial root-rot of field corn.** Arkansas Agric. Exp. Sta. Bull. 162. *18 p. 4 pl.* Aug., 1919.—The author describes a serious root-rot disease of field corn, considered identical with that studied by Burrill in Illinois in 1889. A bacterium was isolated from the diseased tissues, inoculated on healthy plants and reisolated from the diseased roots resulting. It is noted that the organism produces lesions on sorghum identical with those produced by the sorghum organism, *Bacillus sorghi*. The organism is not described further than to note that it is motile by one polar flagellum.—*John A. Elliott.*

2743. **Royal Institute of Public Health. The bacteriological testing of disinfectants.** Jour. State Med., London, 27: 2. 1919.

2744. RUTGERS, A. A. L. **Bastziekten in de F. M. S.** [**Bark diseases of Hevea brasiliensis in the Federated Malay States.**] Arch. Rubbercult. Nederlandsche-Indie 2: 57–59. 1918.—Review of articles on stripe canker and brown bast disease in the Malayan Tin and Rubber Journal for August, September, and October, 1917. The brown bast disease of *Hevea* is definitely identified by RUTGERS with the condition which he described as "bruine Binnenbast" in connection with canker phenomena. By H. C. PRATT it is considered probable that the disease is caused by *Phytophthora*. BELGRAVE reported that no *Phytophthora* was found in specimens of *Hevea* suffering from "brown bast" or "water-logged bark," or in burred trees, but that a member of the Plasmidiophoraceae, apparently a new species of *Spongospora*, was present, and that there was little doubt that it was the cause of the disease, although inoculation experiments had not been performed.—*H. H. Bartlett.*

2745. RUTGERS, A. A. L. **Voorschriften voor de bestrijding van bastziekten bij Hevea** (**uitgegeven door het Algemeen Proefstation der Avros, October 1917**). [**Instructions for the combating of bark diseases in Hevea.**] Arch. Rubbercult. Nederlandsche-Indie 2: 55–57. 1918.—Abstract in Dutch and English of a circular on the treatment of stripe canker (black thread disease), patch canker, brown bast disease, and burrs, issued by the General Experimental Station of the A. V. R. O. S. to the members of the association of rubber planters of the East Coast of Sumatra.—*H. H. Bartlett.*

2746. SALMON, E. S., AND H. WORMALD. **Potato spraying experiments at Wys College Fruit Experiment Station, East Milling, Kent.** Jour. Bd. Agric. Great Britain 26: 71–77. 1 *fig.* 1919.—A series of field experiments was carried out in 1918 with "British Queen," a second-early variety of potatoes to determine the value of spraying such a variety. One application of Bordeaux or Burgundy mixture resulted in loss, owing to the spraying lengthening the period of ripening while not protecting the crop from attacks of blight (*Phytophthora infestans*). Under the same seasonal conditions, two sprayings with either Bordeaux or burgundy mixture resulted in an increase of 2.37 tons and 1.5 tons, respectively, of sound tubers per acre. [See also next following Entry, 2747.] *M. B. McKay.*

2747. SALMON, E. S., AND H. WORMALD. **Potato-spraying experiments at Wye College, 1918.** Jour. Bd. Agric. Great Britain 26: 269–278. 2 *fig.* 1919. Tests were conducted to compare the relative efficiency of two and three applications of Burgundy mixture on Great Scot potatoes for controlling late blight (*Phytophthora infestans*). Also plots were sprayed with Bordeaux mixture and a new copper-containing mixture in which sodium silicate replaced the washing soda.—The Burgundy and sodium-silicate-Bordeaux mixtures both produced scorching which killed or injured many of the leaves so the fungicidal action was difficult to judge. The best results were obtained on the plots sprayed three times with 1.4 per cent Bordeaux mixture, which caused no scorching, the increase being at the rate of 2 tons 9 cwt. per acre. [See also next preceding Entry, 2746.]—*M. B. McKay.*

2748. SAVAGE, WILLIAM G. **Disinfection: its place and application in public health work.** Jour. R. Sanit. Inst. London 39: 54–61. 1918.

2749. SCALIA, G. **Sull' Ascochyta pisi Lib.** [**On Ascochyta pisi.**] Staz. Sper. Agric. Ital. 51: 228–242. 8 *pl.*, 5 *fig.* 1918.—See Bot. Abstr. 4, Entry 1158.

2750. SCHAMBERG, JAY F., JOHN A. KOLMER, GEORGE W. RAIZISS, WITH THE ASSISTANCE OF MARY E. TRIST. **Sodium oxy-mercury-ortho-nitro phenolate (mercurophen), with special reference to its practical value as a disinfectant.** Jour. Infect. Dis. 24: 547–582. 1919.—See Bot. Abstr. 3, Entry 830.

2751. Schander, R. **Beobachtungen und Versuche über Kartoffeln und Kartoffelkrankheiten im Sommer 1917.** [Observations and investigations of potato diseases in 1917.] Fühling's Landw. Zeit. 67: 204–226. 1918.—Numerous tubers of the varieties Atlanta and Kaiserkrone were attached by *Phytophthora infestans* although stems and leaves were free.—Author thinks late blight control should be sought primarily in development of disease resistant varieties. [From abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 118–119. 1919.]—*D. Reddick.*

2752. Schoyen, T. H. **Beretning om skadeinsekter og plantesygdommer i landog havebruket 1917.** [Report on insects and diseases of field and garden crops in 1917.] Aarber. Landbr. Dept. [Norway] 1917: 29–101. 1918.—Brown leaf-spot of barley (*Pleospora teres*) was very abundant on account of wet weather.—Potato wart (*Synchitrium endobioticum*) has appeared in increasing abundance and regulatory mandates must be issued.—Gooseberry mildew (*S. mors-uvae*) continues to spread. It occurs on black currant but rarely winters on this host.—Rose mildew (*Sphaerotheca pannosa*) was not controlled by spraying with 0.4 per cent formaldehyde solution.—The disease caused by *Exobasidium azaleae* can not be controlled by use of lime-sulfur solution. The affected leaves must be picked off before the fungus sporulates.—[From abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 107–108. 1919.]—*D. Reddick.*

2753. Schwartz, M. **Ueber die Nachtschneckenplage 1916 in Nordfrankreich.** [Plague of slugs in northern France in 1916.] Zeitschr. Pflanzenkrankh. 29: 81–84. 1919.

2754. Schoevers, T. H. C. **De tomatenkanker, een voor Nederland ernstige tomatenziekte.** [Tomato canker: a serious disease in Holland.] Tijdschr. Plantenz. 25: 174–192. *Pl. 3–5.* 1919.—A canker disease of the stalks of tomatoes occurring both in the greenhouse and in the field is described. Fruits are also affected especially about the stem end, inducing a rot which causes them to drop. No lesions on leaves or petioles were discovered. A girdling followed by a wilting of the parts above the stalk lesion is the most striking symptom. Pycnidia of a species of *Ascochyta* develop abundantly on the cankered areas. This fungus was obtained in pure culture and its causal relation established by controlled infection experiments. Although the author obtained no perfect stage of the parasite, he believes it to be identical with *Ascochyta citrullina* the perfect stage of which is known to be *Mycosphaerella citrullina*. The pathogene which has been destructive the past two seasons appears to be widely distributed in Holland. It seems to have been but recently introduced, probably from England. This disease may be mistaken for the wilt due to *Verticillium alboatrum* or for the root rot caused by *Rhizoctonia solani* but is readily distinguished from either of these upon critical examination of the symptoms. No satisfactory method of control has been discovered. Sanitary measures are recommended.—*H. H. Whetzel.*

2755. Schultz, E. S., Donald Folsom, F. Merrill Hildebrandt, and Lon A. Hawkins. **Investigations on the mosaic disease of the Irish potato.** Jour. Agric. Res. 17: 247–273. *Pl. A, B and 25–30.* 1919.—Mosaic is widely distributed in the United States. Characteristic symptoms, which appear on aerial parts only, may be modified or obscured by differences in environment or of variety. Tubers of diseased plants transmit the disease. It is also transmitted by diseased scions in grafting, by transfer of expressed juice from a diseased to a healthy plant, and by at least 2 sucking insects, *Myzus persicae* and *Macrosiphum solanifolii*.—Foliage of mosaic plants show a higher sugar content and lower starch content than that from healthy plants.—Tubers from plants showing mosaic may develop plants free from the disease, or the progeny may show no ill effects of the disease, or, not uncommonly, the yield is considerably decreased.—Hill selection alone is not a satisfactory means of control because plants may become affected late in the season and show no symptoms of the disease although the progeny shows that infection occurred.—Rogueing out diseased plants before the appearance of mosaic transmitting insects has been found efficient in checking the spread of the disease.—*D. Reddick.*

2756. STAKMAN, E. C. **The black stem rust and the barberry.** U. S. Dept. Agric. Yearbook 1918: 75–101. *14 pl. (8 colored), 38 fig.* 1919.—Damage caused by rust is enormous. It is a limiting factor in some localities. A list of the common rusts is given with methods of telling them apart, illustrated by colored plates. A very considerable number of species of grasses are attacked. The black stem rust (*Puccinia graminis*) has many forms which are specific in attack. The life history of the rust is given in detail, illustrated. The rust on seeds does not infect young sprouting grain. The summer spores (uredospores) can not winter except in the gulf states and in California. There is no migration from these regions north. Rust damage can be reduced by proper soil management, early sowing, seeding with resistant varieties of grains, destruction of rusting grasses, and eradication of barberry.—The importance of the role of barberry was shown by tracing infection of grains to bushes located from eighty rods to a mile or more away, so that barberry bushes located in towns may be the cause of a severe rust in the surrounding country. A discussion of the various varieties of barberries and their relation to rust is given. Of the numerous species, two types of barberry are distinguishable, those that resemble *Berberis vulgaris* which carry rust and those resembling *Berberis thunbergii* which do not carry rust.—Denmark has solved the rust problem by eradicating the barberry. A history of barberry laws is given. Sentiment for eradication of barberry is increasing and should be fostered.—*C. J. Shirk.*

2757. SEVERENCE, GEORGE. **Twenty-eighth annual report for the year ending June 30, 1918.** Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—See Bot. Abstr. 3, Entry 1882.

2758. SEVERIN, H. H. P. **Investigations of the beet leafhopper (Eutettix tenella Baker) in California.** Jour. Econ. Entomol. 12: 312–326. *Pl. 15.* 1919.—The source of the beet leafhopper in the spring, its hibernation through fall and winter, native plants from which it transmits leaf curl to beets (*Beta vulgaris*) and related cultivated plants, life history and related topics are discussed. The hoppers leave the native vegetation in the spring for the more succulent plants of the cultivated fields and return to the native plants in the fall. This fact has important bearing on the time of planting sugar beets. Beets planted in November, December and January in San Joaquin Valley, conditions being favorable, usually produce good crops, though with an increase in number of plants producing seed stalks (with lower sugar content) early, and tougher roots. The young plants are sometimes killed by frost when planted early.—The disease was transmitted to sugar beets from the following plants by transferring hoppers: *Atriplex elegans, A. semibaccata, Sesuvium sessile, Larrea divaricata* and *Erodium cicutarium;* Bur clover (*Medicago hispida*) developed curly leaf when attacked by beet leafhopper from *Erodium cicutarium,* bur clover, and grass. Non-virulent adults reared from eggs and kept on black mustard (*Brassica nigra*) failed to transmit the leaf curl to beets when allowed to feed previously on creosote bush (*Larrea divaricata*), obtained from the Mojave desert and Imperial Valley; a non-virulent hopper transmitted the disease to beets when allowed to feed previously on lowland purslane (*Sesuvium sessile*) collected at Niland, but two failed to transmit the disease when fed on purslane from "Dixieland."—Leafhoppers "bred" from the following plants transmitted curly leaf to beets: *Atriplex rosea, A. expansa, Salsola kali,* var. *tenuifolia, Amaranthus retroflexus, Am. graecizans, Am. deflexus, Sesuvium sessile, Brassica arvensis* and *Solanum nigrum* var. *douglasii.*—A study of the seasonal migrations of the leafhoppers from native plants in the spring to cultivated beets and return to native vegetation in the fall, suggests a cycle of plants which harbor the disease —*A. B. Massey.*

2759. SHAPOVALOV, M. **Some potential parasites of the potato tuber.** Phytopath. 9: 36–42. *Pl. 2–3, fig. 1–2.* 1919.—Potato tubers of the Irish cobbler variety were inoculated with the mycelium of pure cultures of *Penicillium oxalicum,* Currie and Thom, *Aspergillus niger* Van Tiegh., and *Clonostachys araucaria* var. *rosea* Preuss, and rots resulted which progressed quite as rapidly as did those produced in tubers by *Fusarium radicicola.* The author considers these organisms to be potential parasites which should be given some serious consideration because of the possibility of their becoming progressively more parasitic.—*Maude Miller.*

2760. Sharpless, J. F. **Spraying tests at Te Kauwhata.** Jour. Agric. [New Zealand] 16: 228–236. 1918.—Various modified Bordeaux mixtures were tested on dormant pear trees for the control of scab (*Venturia pirina*). None decreased the amount of scab.—Later treatments with Bordeaux mixture gave excellent control. Pickering's Bordeaux was not effective nor was lime-sulfur solution at the strength at which it can be used with safety (1:80).—Lime-sulfur solution (1:100 or weaker) and atomic sulfur (about 1:10) gave equally satisfactory control of apple mildew.—*D. Reddick.*

2761. Silberschmidt, W. **Kritik unserer Anschauungen über Desinfektion und Desinfektions-Mittel.** [A criticism of our views concerning disinfection and disinfectants.] Correspondenzbl. Schweiz. Aerzte 49: 593–600. 1919.

2762. Small, W. **Annual report of the Government botanist 1917–18.** Ann. Rept. Dept. Agric. Uganda Protectorate 1917–18: 52. 1918.—Brief account of most prevalent plant diseases on coffee, cacao, and *Hevea* during the year.—*Anna E. Jenkins.*

2763. Smith, Annie Lorrain. **Hyphomycetes and the rotting of timber.** Trans. British Mycol. Soc. 6: 54–55. 1918.—In addition to *Merulius lacrymans*, the author reports two hyphomycetes found attacking timbers in houses. *Torula abbreviata* Cda. was isolated from dark speckles in wood from portion of beam from modern house in Surrey. Fructifications of a *Haplographium* resembling most nearly *Haplographium finitimum* Sacc. were found in darkened disintegrated portions of beam from old house in Suffolk.—*Anna E. Jenkins.*

2764. Smith, J. W. **The effect of weather upon the yield of potatoes.** Potato Mag. 1^{10}: 11–14, 32; 1^{11}: 15–17; 1^{12}: 7, 16–17, 27; 2^{1}: 16–17, 33–34. *Fig. 1–25.* 1919.—See Bot. Absts. 3, Entry 1886.

2765. Sourbac, L. **Maladies du prunier.** [Plum diseases.] Prog. Agric. et. Vitic. 69: 180–186. 1918.

2766. Stakman, E. C., H. K. Hayes, Olaf S. Aamodt, and J. G. Leach. **Controlling flax wilt by seed selection.** Jour. Amer. Soc. Agron. 2: 291–298. *Pl.* 9. 1919.—The authors report the results of four years of selection of flax which is resistant on "flax-sick" soil (soil infested with *Fusarium lini*). Experiments conducted at Waseca and University Farm, Minnesota, have given good results by the bulk method of selection and it has been shown that by careful selection a good crop of flax may be produced on heavily infested soil.—*F. M Schertz.*

2767. Stewart, F. C. **Notes on New York plant diseases, II.** New York Agric. Exp. Sta. [Gensva] Bull. 463: 157–188. *Pl. 1–8.* 1919.—A collection of short notes on diseases of cultivated plants, *viz.*, diseases caused by *Peronospora trifoliorum*, *Ascochyta imperfecta*, and *Pyrenopeziza medicaginis* on alfalfa; *Leptosphaeria coniothyrium* on apple; *Bacillus carotovorus* on carrot and *Amorphophallus similense*; *Gnomonia leptostyla* and *Microstroma juglandis* on butternut; *Phoma lingam* and a sclerotial fungus on cabbage; *Sclerotinia libertiana* on carrot; *Cecidomyia catalpae* on catalpa; *Sclerotinia cinerea* on sand cherry; *Fomes applanatus* and *Coccomyces hiemalis* on cherry; *Gleosporium caulivorum*, *Pseudopeziza trifolii*, *Rhizoctonia* sp., and *Cercospora* sp. on clover; *Pythium debaryanum* on cucumber; *Pseudopeziza ribis*, *Cercospora angulata*, *Fomes ribis*, *Sphaerotheca mors-uvae*, *Hypholoma perplexum*, and *Botrytis* sp. on currant; and *Mycosphaerella ulmi* on elm: also, diseases of non-parasitic or undetermined origin, *viz.*, fruit-pit and stem-constriction disease of apple; stem-and-root disease of apples and pears; black leaf-speck of cabbage; winter injury of cherry; yellow leaf of cherry and elm; crinkle leaf, fruit drop, sunburn, tipburn, imperfect buds, and witches' broom on currant; and trunk injury and a branch disease of elm.—*F. C. Stewart.*

2768. Stift, Anton. **Bemerkenswerte Mitteilungen über das Auftreten von tierischen Feinden und Krankheiten der Zuckerrübe in Jahre 1917. B. Krankheit der Zuckerrübe.** [Noteworthy information on the animal enemies and diseases of sugar beets in 1917. [Blätter

Zuckerrübenbau 25: 43–45. 1918.—A general résumé is given of literature on the troubles of sugar beets in Austrian territories in 1917.—ÜZEL reports a Bohemian beet disease which has been spreading steadily through the growing season. The characteristics of the disease are sickly-looking leaves and loss of side roots, sometimes even the main root falling off. Adventitious roots appear giving the root an irregular shape. The trouble possibly is caused by methods of fertilization or drainage, irrational rotation of crops or use of land not suited to beet culture. Remedy suggested is the use of seed from sound beets as this disease may be transmitted through the seed. A report is given of Austrian seed disinfection experiments during the year. Bacterial troubles are reported.—*Caroline Rumbold.*

2769. TANNER, FRED W., AND RUTH S. FUNK. Some observations on the use of boric acid as a disinfectant. Amer. Jour. Pharm. 91: 206–210. 1919.—As a result of a short study of boric acid as a disinfectant, the authors arrive at the conclusion that boric acid should not be employed in cases where a disinfectant is absolutely essential. The experiments consisted of adding increased amounts of a saturated solution of boric acid to tubes inoculated with various types of bacteria. The silk thread method was also employed.—*Anton Hoglund, Jr.*

2770. TAYLOR, E. P. Uniformity of rules and regulations of potato seed certification. Potato Mag. 2[1]: 7, 21–23. *1 fig.* 1919.

2771. TISDALE, W. H. Report of the division of plant pathology and bacteriology. North Carolina Agric. Exp. Sts. Ann. Rept. 41: 58–59. [1919.]—A brief report of work by WOLF on tobacco wildfire, trembles and milksickness, intumescences on cabbage, and bacterial blight of the soybean.—*R. A. Jehle.*

2772. TOWNSEND, C. O. An immune variety of sugar cane. Science 49: 470–472. May, 1919.—F. S. EARLE noted that among about twenty varieties of cane growing at the federal station at Mayaguez, Porto Rico, there was one variety, *Kavangire*, free from the mottling disease (mosaic). Tests were made with ninety varieties of cane, the first planting being made on Oct. 1, 1918. Ten weeks later all varieties showed infection with the exception of Kavangire, and this variety was still uninfected at the time of writing (March, 1919). Earle raises the question as to whether or not Kavangire can be successfully used for general planting in Porto Rico. If it can, and retains its immune characteristics, the question of combating the mottling disease is solved.—*A. H. Chivers.*

2773. TURCONI, MALUSIO, AND LUIGI MAFFEI. Note micologicha e fitopatologiche. I.—Un nuovo genere di Ceratostomataceae. II.—Due nuovi micromiceti parassiti della Sophora japonica Linn. [Mycological and pathological notes.] Atti Ist. Bot. Univ. Pavia II, 15: 143–149. *Pl. 1.* 1918.—To the family *Ceratostomataceae* is added a new genus, *Chaetoceratostoma* represented by *C. hispidum* found on dead leaves of *Castanea vesca* in Liguria.—A new species *Macrosporium sophoræ* which causes a spotting of leaves of *Sophora japonica* is described. Also *Gibberella briosiana* which causes a white canker on the stems of *Sophora japonica*. Successful inoculations were made with spores and affected tissue in the case of the last-named fungus.—*F. M. Blodgett.*

2774. ÜZEL, H. Über Krankheiten und Schädiger der Samenrübe in Böhmen in den Jahren 1916 und 1917. [The diseases and enemies of seed beets in Bohemia in 1916 and 1917.] Blätt. Zuckerrübenbau 25: 187–192. 1918.—In 1916 seed beets were infested with black aphis (schwarzen Blattlaus). There was much complaint about the birds: lark, titmous, siskin and especially sparrow, stripping the seed stalks of seed when they were half ripe. Damping-off fungi affected the roots, and leaf troubles were caused by *Sporodesmium putrefaciens*, *Cladosporium herbarum* and bacteria.—In 1917 there was an outbreak of black aphis on both field and seed beets, and some green aphis; field mice caused much loss. A warning is given to choose for seed only those seed beets which show resistance to nematode attacks. Bacteria caused much rotting of the roots in the earth. Very little *Cercospora* was seen due to the dry weather.—*Caroline Rumbold.*

2775. Üzel, H. **Berichte über Krankheiten und Feinde der Zuckerrübe in Böhmen und der mit derselben abwechselnd kultivierten Pflanzen im Jahre 1916. [Report on diseases and enemies of sugar beets and their accompanying crops in Bohemia in 1916.]** Blätt. Zuckerrübenbau 25: 175–179. 1918.—The greatest loss was caused by beet nematodes, next in degree came the damping-off fungi. Hs reports also *Sporodesmium putrefaciens*, *Phyllosticta betae*, *Cladosporium herbarum*, *Cercospora beticola* and *Uromyces betae*. Black aphis, beet beetles and wire worms are reported. Field mice and musk rats damaged the crops.—*Caroline Rumbold.*

2776. Üzel, H. **Aus der phytopathologischen Abteilung der Versuchstation für Zuckerindustrie in Prag. [Report of the phytopathological division of the experiment station for the sugar industry in Prag.]** Blätt. Zuckerrübenbau 25: 163–164. 1918.—The sugar beet crop was extremely good. There was some leaf spot (*Cercospora beticola*). A warning is given that all beet leaves should be cleared from the fields after harvest. Plants infected with leaf spot should not be used as mother beets because the seed may carry spores. Suspicious seed should be disinfected. Beets showing heart rot should not be used as mother beets since such seed may have a tendency to heart rot. All siloed beets should be packed, if possible with "Sulfin" or at least with powdered lime.—*Caroline Rumbold.*

2777. Van der Bijl, Paul A. **Observations on a fungus—Cephalosporium sacchari Butler—which causes a red rot of sugar-cane stems.** Union of South Africa Dept. Agric. Sci. Bull. 11. 1919.—A red rot of sugar cane occurring in Natal is caused by the fungus *Cephalosporium sacchari* Butler. This disease has been previously recorded from India, Barbados, Trinidad and Leeward Islands. Infection experiments proved the pathogenicity of the fungus which appears to be of the nature of a weak parasite, and spreads slowly through the cane stalks. It is suggested that although the fungus does not produce spores on growing cane these may be liberated in abundance from decaying stalks, and that possibly some of the caneleaf spots may be due to this fungus. The following control measures are suggested: (1) the destruction of infected cane, (2) the avoidance of infected cane when taking sets for planting.—*E. M. Doidge.*

2778. Van der Bijl, P. A. **A ripe rot of paw-paws.** South African Fruit Grower 6: 177. *4 fig.* 1919.—The disease occurs commonly along the Natal coast, but the causal fungus has not been identified. Removal of dead leaf stalks and spraying with Bordeaux mixture are recommended as control measures.—*E. M. Doidge.*

2779. Van der Broek, M., and P. J. Schenk. **Ziekten en Beschadigingen der Tuinbouwgewasse. [Diseases and enemies of garden plants.]** 2 ed. J. B. Wolter: Groningen, 1918.

2780. Van Houten, J. M. **The fatality of crown gall in apple orchards.** Better Fruit 14^4: 9. October, 1919.—A condensed popular review of Iowa Agric. Exp. Sta. Research Bull. 50.—*A. E. Murneek.*

2781. Veall, J. J. **Black spot of pear. An orchardist's control experience.** Jour. Agric. [New Zealand] 16: 288–290. *1 fig.* · 1918.

2782. Vincent, C. C. **Lime-sulphur summer spray for apple scab.** Better Fruit 13^{11}: 9, 24. *Tab. 1–5.* May, 1919.—Experiments conducted for three years with the use of lime-sulphur as summer spray for apple scab in Northern Idaho has shown that three applications—(1) when blossom buds show pink, (2) when petals fall, and (3) three weeks after petals fall, completely controlled scab on most varieties of apples. Grimes being more resistant to scab, ons application, at time the buds show pink, was found sufficient to reduce scab to a negligible amount. Experimental data are given.—*A. E. Murneek.*

2783. Waterbury, H. E. **[Plant diseases and treatments.]** Bienn. Rept. Washington [State] Dept. Agric. (3) 1917–18: 84–87. 1918.

2784. WEST, ERDMAN. **An undescribed timber decay of hemlock.** Mycologia 11: 262–266. 1919.—See Bot. Absts. 4, Entry 1188.

2785. WESTERDIJK, JOHANNA. **Neueres über Flachskrankheiten.** [Flax diseases.] Jahresber. Vereinig. Angew. Botanik 16: 1–8. 1918.—Flax blight, caused by *Fusarium lini*, is very destructive in Holland. White-flowered flax is more resistant than blue-flowered kinds.—Rust (*Melampsora lini*) appears in wet seasons when the plants are nearly mature and only on white-flowered kinds. It develops best on highly fertilized, rank plants.—Anthracnose (*Gloeosporium lini*) occurs on stem, capsule and seed. It is controlled by seed treatment, for 3 hours, with formaldehyde vapor.—*Botrytis cinerea* may appear in damp weather particularly on seedlings.—A dead-stem disease has appeared in North Holland. Plants are brown and dry. A species of *Phoma* occurs on many plants but not on all. [From abstract by O. K[IRCHNER] in Zeitschr. Pflanzenkr. 29: 121. 1919.]—*D. Reddick.*

2786. WINSTON, J. R., AND FULTON, H. R. **The field testing of copper-spray coating on foliage.** Better Fruit 13[11]: 9, 27–28. June, 1919.—A field test has been devised to indicate the copper-spray coating on foliage. The method is as follows: 200 gm. of fresh leaves are washed for 3 minutes in 1000 cc. of 0.2-per cent solution of chemically pure nitric acid in water. Some of the wash water is treated with a few drops of 2-per cent solution of potassium-ferrocyanide to precipitate copper. A color comparison is then made with a series of standard copper solutions of known strength. The latter are made by proper dilution from a stock solution of 3.928 gm. of copper sulphate in water to make 1000 cc.— About 75 spraying schedules, extending over two seasons, have been tested. Representative results of tests on apples in Virginia and grape fruit and nursery stock in Florida are considered in detail. The authors conclude that the method may be of service (1) "To secure data showing the persistence of copper-containing sprays as it may be influenced by method of preparation, weathering, or other factors; (2) to determine the minimum and maximum limits of working safety-zones, as measured by evenly distributed residues, effective to the practical control of specific diseases; (3) to secure prompt correction of faulty spraying practices, either in the preparation of mixtures or in the times or modes of application; and (4) to serve as a practical guide in timing new applications, especially after rainy periods."—*A. E. Murneek.*

2787. WORMALD, H. **The brown rot diseases of fruit trees with special reference to two biologic forms of Monilia cinerea Bon. I.** Ann. Botany 33: 361–404. *Pl. 25–26.* 1919.— Two distinct species of *Monilia* (*fructigena* and *cinerea*) occur as parasites on fruit trees in England. Each species has two forms, to be distinguished by the effects produced on mature apples inoculated under laboratory conditions.—*M. cinerea* has two biologic forms, *mali* and *pruni*, the former only, being able to produce a blossom wilt and canker disease of apples. Literature is reviewed extensively, methods and experiments are described in detail and a lengthy bibliography is appended.—*D. Reddick.*

2788. WÖBER, A. **Ueber die chemische Zusammensetzung der Kupferkalkbrühe.** [Chemical composition of Bordeaux mixture.] Zeitschr. Pflanzenkrankh. 29: 94–104. 1919.—Discussion of the precise chemical actions taking place in the preparation of Bordeaux mixture. Alkalinity of solution is essential; acidity is easily removed by rain, and this makes solution likely to cause damage by burning.—*H. T. Güssow.*

2789. WURTH, TH. **De schade aangericht door de Kloetuitbarsting op de koffie- en Rubberlanden van den Kloet.** [Damage to coffee and rubber by the Kloet eruption.] Proefsta. Malang [Java] Circ. 7. 3 *p.* 1919.—Preliminary survey of the damage to 31 plantations on the slopes of the Kloet volcano is given. Besides the local destruction of trees by mud streams and falling stones, most of the high-lying areas showed severe scorching and death of leaves attributed to heated air currents and also to ash rains, with possibly poisonous gases. Hard-packed layer of sand and ash particles, in consequence of the presence of colloidal silicic acid, caused damage by preventing entrance of air and water to the soil.—*R. D. Rands.*

2790. ZACHAREWICZ, ED. **Traitements contre le mildiou et l'oïdium.** [Treatment for the mildews of grapes.] Jour. Agric. Prat. 31: 127–128. 1918.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

NEW PLANTS FOR PHARMACEUTICAL USES

2791. CHURCH, T. A. **Sphagnum moss now commercial product.** Pharm. Era 52: 253–255. *4 fig.* 1919.—The author states that the recent war developed the use of this article as a surgical dressing and that it is now offered on a commercial scale, promising to supplant cotton and other absorbent materials for some uses. He gives a history of the discovery of the uses of Sphagnum, the search for and discovery of the plants in commercial quantities and their descriptions, development, habitat, etc. The most important species are *S. imbricatum*, *S. palustre*, and *S. papillosum*.—*Oliver Atkins Farwell.*

2792. YOUNGKEN, HEBER W. **Notes on the dasheen and chayote.** Amer. Jour. Pharm. 91: 498–510. *15 fig.* 1919.—Article embraces descriptions of the macroscopical and microscopical characteristics of the two vegetables, the Trinidad dasheen—*Colocasia esculenta* (L) Schott—and the Chayote—*Chayote edulis* Jacq. Data are given concerning their uses and methods are described for their preparation as foods. [See Bot. Absts. 4, Entry 976.]—*Anton Hogstad, Jr.*

MEDICINAL PLANT CULTURE AND PREPARATION

2793. ANONYMOUS. **Scottish station for research in plant breeding.** Pharm. Jour. 103: 191. 1919.—By public subscription in Scotland, £16,000 has been raised, to be supplemented by a similar amount from the public funds, for the establishment of an Institute of Agricultural Botany. Research in drug plant cultivation and breeding is planned. England already possesses such an institute and Wales, through the munificence of one of her citizens, is soon to make a beginning.—*E. N. Gathercoal.*

2794. ANONYMOUS. **The economic resources of Burma. III. Citronella oil.** Chem. and Druggist 91: 815. 1919.—The distillation of citronella oil from *Andropogon Nardus*. The plant thrives luxuriantly in the jungle districts of lower Burma. Cultivation was begun in 1912 by U. Shwe Thwin who has fathered the industry and overcome many difficulties during the period of the war. In 1914 Burma citronella oil was recognized in the London market, and graded as equal in quality with Java and Ceylon oil. The industry is now well established. —*E. N. Gathercoal.*

2795. DE GRAAF, W. C. **De cultuur van geneeskrachtige planten in Nederland.** [Cultivation of medicinal plants in Holland.] Pharm. Weekblad 56: 1101–1112. 1919.—An account of the results obtained in growing belladonna, henbane, stramonium, digitalis, valerian and peppermint, is given. The quantity and quality were very satisfactory.—*H. Engelhardt.*

2796. HOGSTAD, ANTON, JR. **The medicinal plant garden and the pharmacist.** Northwestern Druggist 27: 389–391. 1919.—See Bot. Absts. 3, Entry 1915.

2797. SKVORTZOW, B. W. **Notes on the agriculture, botany and zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 2462.

2798. TODD, P. H. **The cultivation of aromatic plants in the United States.** Amer. Jour. Pharm. 91: 437–441. 1919.—See Bot. Absts. 3, Entry 1894.

COMMERCIAL SUPPLIES

2799. FRENCH, H. B. **Report of the drug market for 1918.** Jour. Amer. Pharm. Assoc. 8: 634–638. 1919.—A comparative list of the prices for drugs in 1914 and 1919.—*Anton Hogstad, Jr.*

2800. RUSBY, H. H. To safeguard the distribution of crude drugs. Druggists Circ. 63: 311–312. 1919.—The author discusses present conditions of the crude drug trade, showing that the broker who may sell more belladonna in a day than all the retail pharmacists handle in a year is under no legal requirement to demonstrate his ability to distinguish belladonna from burdock or poke, while the other is so required. He suggests a change in the law that would require all brokers in crude drugs to employ trained and licensed pharmacognosists who would be held personally responsible by the State for the results of their determinations. —*Oliver A. Farwell.*

2801. ANONYMOUS. The tonka beans of commerce. Sci. Amer. Suppl. 87: 78. 1919.—The tonka tree (*Dipteris odorata*), one of the well-known forest trees of Colombia, Venezuela, the Guianas and Brazil, is variously known also as sarapia, serrspia, tonca, tonqua and tonquin. The tonka tree finds its best development along the Caura River, a large tributary of the Orinoco in Venezuela. Little is known regarding its occurrence in Colombia and Brazil, and it is only sparingly scattered throughout the forests of Trinidad and the Guianas. The tree is rarely cut for the wood it yields, chiefly because of the logging difficulties involved, but also because the fruit of the tree has a commercial value. The tree reaches a height of 15 feet and upward, and may attain a diameter of 3 feet. The wood is very hard, heavy, strong, tough and durable. It has a fine texture and is cross-grained, can be polished and in this state is very valuable for cabinet work and interior finish. Large pink flowers in showy terminal panicles are produced during June, July and August. The fruit is a [illegible] pod about 2 inches long and contains a seed which is known in the trade as the tonka bean. The seeds owe their value to a crystalline substance (coumarin), which has a fragrance resembling that of new mown hay. It is used as a flavoring material in tobacco, snuffs, cigars, cocoa, ice creams, confectionery, toilet soaps, hair dressings, cosmetics, flavoring extracts, etc. The oil expressed from the cotyledons of the seeds has a clear yellow color and is used as a therapeutic in medicine. The pulverized seeds form an ingredient used in the preparation of sachet powders.—*Chas. H. Otis.*

2802. FAULL, J. H. Pineapple fungus or enfant de pin or wabadou. Mycologia 11: 267–272. 1919.—The history of *Fomes officinalis* as a medicinal plant is discussed.—*H. R. Rosen.*

2803. LIND, J. Apoteker C. Heerfordts Herbarier. [The herbarium of the chemist C. Heerfordt.] Bot. Tidsskr. 36: 1–19. 1917.—See Bot. Abstr. 4, Entry 1742.

ANATOMICAL AND HISTOLOGICAL CHARACTERS

2804. KONDA, MANTARO. Untersuchung über die Dicke der Reiskleieschicht. Investigations on thickness of rice husks [*Oryza sativa* L.]. Ber. Ohara Inst. Landwirtsch. Forsch. 1: 219–229. 1917.—The author has examined 50 kinds of rice with microscopic measurements of husk thickness. Thickness is greater in the earlier stages of development than when the grain is mature. The outer layer (embryo and endosperm) is very thick in the earlier stages of growth, especially during the "milk" period, but becomes thinner at maturity; the inner layer (perisperm and aleurone) behaves in the opposite manner. Grains harvested when fully mature have very thin husks and their bran contains more aleurone and fat than when they are harvested too soon. Thickness of husk (outer as well as the inner layer) varies with the kind of grain. It is very thick in rice of poor quality and very thin in that of good quality. Grains of better quality produce less bran, which, however, is rich in aleurone and fat. The husks of rice grown in mountainous regions are not significantly thicker than those from lowland rice. The embryo is especially thin in upland rice. Upland bran contains just as much aleurone and fat as does that of good-grade lowland rice. The husk of mucilaginous rice is, on the whole, much thicker than that of ordinary rice. The seed-coat of red rice consists of a layer of large cells, about 7–9 micra thick and filled with red pigment. The whole husk is much thicker here than in the case of white rice.—*M. H. Chow.*

2805. Kondo, Mantaro. **Über Nachreife und Keimung Verschieden Reifer Reiskörner. Investigation on maturity and germination of rice seeds.** [*Oryza sativa* L.] Ber. Ohara Inst. Landwirtsch. Forsch. 1: 361–387. 1918.—The author found that rice grains in the milk (milchreif) already possess germinating power, even if this is low. Immediately after the harvest they germinate little and remain in the resting condition during a period of 30 days, even when the surroundings are good for germination, but if they are kept for about fifteen days after the harvest (or a month if not so dry) then they germinate well. Grains in the "yellow stage" (gelbreif) also germinate but little when just harvested. After being kept for from one to three months, they germinate just as well as the full grown grains. The latter germinate soon after the harvest, but will do better after being kept and further delayed for a month. Mature (todreif) grains germinate at once after harvest, but do not allow any delay. When these are preserved dry, after-ripening (Nachreifeprozess) begins quickly and soon ends, whereas if they are preserved moist, it proceeds slowly and lasts for a long time. When after-ripening is complete, grains which have been kept moist germinate more abundantly and more quickly than those kept dry. The preservation of the immature grains in the straw is often very detrimental; germination goes very slowly and lasts for a long period. The more nearly mature they are and the farther the after-ripening and drying has gone on, the more quickly and uniformly does germination occur.—*M. H. Chow.*

2806. Konda, Mantaro. **Untersuchung der Samen der in Japan vertretenen Brassica-arten. Ein Beitrag zur genauen Feststellung der Sortenunterschiede. Investigation of the seeds appearing as mustard** [*Sinapis*] **in Japan.** A contribution to the exact differentiation of these forms. Berl. Ohara Inst. Landwirtsch. Forsch. I: 123–150. 1917.—The different kinds of mustard may be distinguished by external characteristics and by the inner structure of the seed-coat and of the cotyledons. While the external appearance of each kind of seed varies greatly, each kind has its peculiar form, color, network, size and weight. He lists three shapes: (1) spheroidal, (2) ovoid, (3) chestnut-shaped. There are also distinguishing colors, such as egg-yolk yellow, chestnut-brown, brown, dark brown, wine-red, dark-purple, black-brown and black. The colors of the different kinds of seed are so peculiar that they can often be differentiated through this character alone. They are all very small and vary widely in size and weight, but size and weight are of some value as specie marks. The surface of the seeds coat shows a network which is large and clear in some kinds, or small and indistinct in other cases. This serves as another distinguishing feature. The epidermis of the seed-coat consists either of thin and flattened cells, or of polygonal, isodiametric mucilaginous cells, in different kinds. The form of the cotyledons, that of the first true leaves, and the color of the hypocotyledon are very different and are characteristic. The cotyledons are either circular, ovoid or elliptical, according to the species. The first leaf is either linear, spatulate, elliptical or ovoid; either thickly hairy or only slightly so; its margin is smooth, toothed or broken. The hypocotyledon is variously colored,—white, light green, rose, bluish brown or dark violet. Most of these mustard seeds are odorless and tasteless, even when crushed. Only those of takana and karaschi-na are characterized by a sharp, burning taste.—*M. H. Chow.*

2807. Samann, Karam. **An experimental study of Strophanthus Kombe seeds.** Pharm. Jour. 103: 66–67. 1919.—Part I deals with the determination of (a) the activity of the fatty oil present in the seeds; and (b) the existence or non-existence in the de-fatted seeds of a physiologically active body beside the water-soluble strophanthin. Particular effort was made to completely dehydrate the seeds and to ensure absolute purity and freedom from water of the various solvents used, for the activity of the oil and of the ether extract obtained by some previous investigators was probably due to the seeds and solvents not having been well dried. —The results may be summarized as follows: (1) The oil of *Strophanthus Kombe* seeds isolated by dry petroleum ether is inactive.—(2) The ethereal residue is inactive.—(3) The poisonous property of the seeds is due to a water-soluble glucoside or glucosides.—(4) No active principle other than the water-soluble body was removed by any of the solvents employed.—(5) Water completely removes the active principle from the seeds.—(6) Methyl

alcohol comes next to water in being a good solvent for the active principle.—(7) Neither absolute ethyl alcohol nor amyl alcohol completely removes the active principle from the seeds.—(8) Amyl alcohol completely removes the active principle from the aqueous residue but not from the seeds.—(9) Chloroform is a very poor solvent for the active principle.—(10) The water-soluble glucosids or glucosides slow the heart, prolong the period of systole and are non-cumulative.—Part II deals with the determination of the minimum lethal dose. The following are the conclusions:—(1) For a frog the oral minimum lethal dose is about twenty times more than that given by intralymphatic injection.—(2) The toxicity of Kombe strophanthin is practically identical with that of Strophanthin Merck.—In Part III, the assay methods of BARCLAY, FROMME (1910) and LAMPART and MUELLER are stated to have given fairly concordant results, which agreed—within limits—with the physiological standardisation and were satisfactory on the whole. However it was not possible to completely remove the bitter principle by the methods of FROMME and LAMPART and MUELLER, which consists in exhausting the seeds with absolute alcohol.—Experiments for exhausting the de-fatted seeds gave the following conclusions: (1) Absolute alcohol is not a good solvent for the active principle present in the seeds.—(2) The lower the percentage of alcohol, the more rapid is the removal of the active principle.—(3) A lower percentage of alcohol than 65 per cent, though it extracts the bitter principle more rapidly, produces an unsightly tincture which is hard to filter.—(4) Water alone is unsuitable, since the aqueous tincture decomposes very quickly.—(5) The best method to prepare a tincture, on a large scale, is to employ slow extraction with 65 per cent alcohol in a long narrow percolator till the seeds are free from bitterness. The resulting tincture may be diluted with 65 per cent alcohol, if necessary, to bring it to the official standard, as determined by chemical and physiological assays.—*E. N. Gathercoal.*

2808. STEENBAUER, A. J. Bijdrage tot de kennis van het geslacht Polygonum. [Contribution to the knowledge of the genus Polygonum.] Pharm. Weekblad 56: 1084-1101. *18 fig* 1919.—A microscopical and phytochemical study of several species of *Polygonum*. The following characteristic formations were found.—*P. aviculare* L.: (1) striate cuticle on upper and lower epidermis; (2) margin of leaf revolute.—*P. bistorta* L.: (1) striate cuticle on borders of cells of upper epidermis; (2) monocellular, furrowed, conical hairs on margin of leaf and on lower epidermis.—*P. convolvulus* L.: at margin of leaf are short monocellular, conical hairs with furrowed cuticle.—*P. dumentorium* L.: leaf with hairy margin.—*P. Hydropiper* L.: schizogenous secretion canals in epidermis.—*P. nodosum* L.: long, cotton-like hairs on upper and lower epidermis.—*P. persicaria* L., *P. amphibium* L. and *P. lapathifolium* L.: multicellular conical hairs on margin of leaf and also scattered on upper and lower epidermis.—*P. mite* Schrk. and *P. minus* Huds.: multicellular conical hairs on margin of leaf.—Some species of polygonum contain oxymethylanthraquinones and a method for estimating these is given. *P. convolvulus* L. contains 0.025 per cent; *P. dumentorum* L. contains 0.02 per cent; *P. sachalinense* Schmidt 0.08 per cent in the leaves and 0.03 per cent in the stems; *P. Seboldii* Hort. 0.02 per cent.—*H. Engelhardt.*

2809. VAN WISSELINGH, C. Bijdragen tot de kennis van de zaadhuid. Vierde bijdrage: Over de zaadhuid der Cruciferen. [Contribution to a knowledge of seed-coats. Fourth contribution: On the seed-coats of the Cruciferae.] Pharm. Weekblad 56: 1246-1271. *2 pl., 13 fig.* 1919.—A report on the microscopical structure of the seed-coats of five species of the Cruciferae: *Matthiola incana* R. Br., *Cheiranthus Cheiri* L. (Arabideae), *Brassica nigra* Koch, *Sinapis alba* L. (Brassiceae) and *Cochlearia officianias* (Alyssineae). It was found that in the seeds the two integuments and the innermost integument and the nucellus are separated in the beginning of the growth by cuticles. The cuticle between the integuments disappears during the development of the seed and in some species this takes place also with the cuticle between the innermost integument and the nucellus. In most cases this cuticle remains and indicates in the ripe seed the boundary between seed coat and endosperm. In the cells which form the innermost cellular layer and the outermost seed coat, always a cork tissue is developed. This also takes place in the cells of the innermost cellular layer of the innermost seed coat and in this case the cuticle between the seed coat and the nucellus disappears. In the

ripe seed a cork tissue is developed in the chalaza layer which joins the cork-cell layer and the inner cuticle or both cork-cell layers in such a way that the endosperm and the embryo are covered by cork tissue or by cork tissue and a cuticle. Therefore, not only the tissue which develops from the integuments of the embryo but also the chalaza cork tissue and the tissue which lays outside of this must be considered as seed-coat. [See Bot. Abstr. 3, Entry 2453.] —*H. Engelhardt.*

ADULTERATION

2810. Small, James. **Triticum repens: A commercial rarity.** Pharm. Jour. 103: 73–75. *Figs. 1–4.* 1919.—The rhizome of *Triticum repens* is a commercial rarity and the chief, if not the only, substitute is the rhizome of *Cynodon Dactylon.* The lens view of transverse sections of *Triticum repens, Cynodon dactylon, Holcus mollis* and *Agrostis vulgaris* are figured. The examination of 15 samples resulted as follows: seven recent commercial samples from English wholesale firms were pure *Cynodon Dactylon;* one was 75 per cent *Triticum repens* and 25 per cent *Cynodon Dactylon;* and one was pure *Triticum repens.* Two samples of dog-grass from French firms were *Cynodon Dactylon;* two samples from pharmaceutical museums, one sample from an old stock in a retail store and one collected on a Kentish farm, were pure *Triticum repens.*—*E. N. Gathercoal.*

2811. Clevenger, J. F., and Clare Olin Ewing. **Santolina Chamaecyparissus L., an adulterant of Matricaria Chamomilla.** Jour. Amer. Pharm. Assoc. 8: 536–538. *2 fig.* 1919. —A shipment invoiced as "chamomilo flowers" labelled in spanish "La manzanilla aroma" was found to consist entirely of the flower heads of *Santolina chamaecyparissus.* A comparison of the 2 flower heads is included.—*Anton Hogstad, Jr.*

PLANT CHEMISTRY

2812. Anonymous. **Determination of oil in seeds.** Sci. Amer. Suppl. 87: 155. 1919.

2813. Cofman, Victor. **A note on "Japanese chiretta."** Pharm. Jour. 103: 82. 1919.—Japanese chiretta, the dry plant of *Swertia chinensis,* recently introduced to the British market, compares very favorably in therapeutic activity with Indian chiretta (*S. chirata*). Similar tinctures (60 per cent alcohol) yielded total solids as follows: *S. chinensis,* 3.12 per cent; *S. chirata,* 1 per cent. The comparative bitterness of the tinctures may be stated thus: quinine hydrochloride, 1–30000; Japanese chiretta, 1–12000; Indian chiretta, 1–1000. Several solvents used in succession on the same sample, in a Soxhlet extractor, yielded the following amounts of extracted matter, as per cent of the sample:

	S. chinensis	*S. chirata*
Petroleum ether (boiling point, 40–50°C.)	3.22	3.20
Ether	5.16	1.34
Chloroform	2.32	0.96
Alcohol (95 per cent)	23.14	8.98
Total extracted matter	33.84	14.48
Ash (whole plant)	3.20	3.24

Chemical constituents of both Indian and Japanese chiretta should be carefully investigated. —*E. N. Gathercoal.*

2814. Berry, Edgar. **A standardization of digitalis preparations.** Pharm. Jour. 103: 69–71. 1919.—The dried leaves of *Digitalis purpurea* were used in the investigation. From previous investigations based on frog heart perfusions, three conclusions may be drawn, viz.: 1. The water-soluble glucosides of Digitalis apparently have the most desirably tonic and slowing effect on the heart, and are non-cumulative and non-toxic. 2. Digitoxin is cumulative and toxic, appearing to enter into actual combination with the heart muscle. 3. The leaf

saponins have a harmful and toxic effect on the heart.—In view of the fact of the great variation of the constituents of Digitalis caused by climatic and soil conditions, it is essential that means be found for estimating the really valuable constituents. To do this, two colorimetric processes for estimating the relative quantities of the glucosides present have been devised. Colorimetric process "A" estimates the water-soluble glucosides only and is designated the "therapeutic value" of the Digitalis tincture. Colorimetric process "B" estimates the total glucosides, viz.: water-soluble glucosides, saponins and digitoxin. Subtracting "A" from "B" gives the "toxic value" of the tincture. To complete the standardization of the drug the minimum lethal dose should be determined either by the usual injection method or by the perfusion method (which is explained in detail in the paper).—In conclusion the author lays much stress on the necessity for careful cultivation of the best strains of plants and the gathering of the leaves under the most suitable conditions year by year, to obtain as uniform tinctures as possible.—*E. N. Gathercoal.*

2815. HOFMAN, J. J. De aetherische olie van Cymbopogon Javanensis. Bijdrage tot de kennis der Indische grasoliën. [The ethereal oil of Cymbopogon Javanensis. Contribution to the knowledge of the oils of Indian grasses.] Pharm. Weekblad 56: 1279–1289. 1919.—The physical and chemical constants of the oil are given and are compared with those of oils obtained from other species of the Andropogoneae, such as palmarosa oil, citronella oil, lemongrass oil, etc.—*H. Engelhardt.*

2816. MAYER, JOSEPH L. Quantitative estimation of menthol in alcoholic solution. Jour. Amer. Pharm. Assoc. 8: 572. 1919.—For the quantitative determination of menthol in alcoholic solutions the author gives the following method: Into an accurately weighed Petri dish (a large watch glass will serve equally well) accurately measure 5 cc. of the sample, then place in a desiccator over sulphuric acid and allow to remain over one night, after which weigh. The increase in weight is due to menthol, the purity of which can be easily determined by making a melting point determination and other physical and chemical tests which may be needed.—*Anton Hogstad, Jr.*

2817. POWER, FREDERICK B. The odorous principles of plants. Chem. and Druggist 91: 971–975, 1003–1008. 1919.—This address on the distribution and characters of some of the odorous principles of plants falls into two main divisions. First, a discussion of the chemical nature of essential oils, their wide distribution in plants, the peculiar fact that oils widely different in their chemical nature may occur in the same plant, and the relation between the odor and the chemical nature of the oil. Second, the oils obtained from the natural groups or families of plants are described and not alone is their chemistry presented, but frequently their economic use and value, their adulteration and their commercial production. Among the families included are the following: Coniferae, Gramineae, Liliaceae, Iridaceae, Orchidaceae, Annonaceae, Lauraceae, Cruciferae, Rosaceae, Myrtaceae, Umbelliferae, Labiatae, Compositae. All of the plants mentioned are identified with their botanic names. In conclusion, the author discusses the world production and trade in volatile oils. The address is a résumé of the most modern thought on this subject.—*E. N. Gathercoal.*

PLANT CHEMISTRY AND PHARMACEUTICAL ASSAYS

2818. PRATT, J. H., AND HYMAN MORRISON. Activity of American digitalis. Jour. Amer. Med. Assoc. 73: 1606–1611. 1919.—Before the world war the greater part of the digitalis (*Digitalis purpurea*) used in this country came from Germany and Austria though some was imported from England. As early as 1868 DUFFIELD had made tests of American-grown digitalis which, he claimed, when properly gathered and dried was better than the English drug. But for many years the American leaf was unused. In 1910, WESSELHOEFT, and in 1911, HALE published assays showing that the American drug was superior to the English leaves with which it was compared. In 1916, ROWNTREE and MACHT found that digitalis from the drug garden of the University of Wisconsin was more active than the samples of English or of old German leaves with which it was compared. In 1917, ROTH concluded that

wild grown digitalis from the northwestern states could be used for making the various preparations of digitalis and a highly active product secured which would compare favorably with the activity of cultivated leaves grown under more favorable conditions. Using the one-hour frog method of the U. S. Pharmacopeia, the authors tested 28 samples of American-grown digitalis; only eight yielded tinctures that met the standards of the U. S. Pharmacopeia. The authors discuss the methods of testing, the difference in strength due to soil and climate and to method of drying, the activity of the water soluble glucosides and the toxicity of various species and varieties of digitalis. They reach the following conclusions:—The best American digitalis, both wild and cultivated, is equal in activity to the best European digitalis. Specimens of high potency have been obtained from Virginia, Nebraska, Wisconsin, Minnesota, Oregon and Washington. The majority of samples of American digitalis examined were of low potency. No less than 17 out of 25 samples of American digitalis were below the standard of strength established by the U. S. Pharmacopeia. The average strength of the American digitalis, however, was greater than that of the imported digitalis examined. —All digitalis should be tested biologically before it is gathered in large quantities for therapeutic use.—*Wm. B. Day.*

2819. Sayre, L. E., and G. N. Watson. Final report on the alkaloids of Gelsemium. Druggists Circ. 63: 423–424. 1919. Also in: Western Druggist 41: 315–316. 1919.—The authors show that the so-called amorphous alkaloid *gelseminine* is not a single alkaloid but a mixture of several having different properties,—*gelsemidine*, *gelsemidine hydrochloride* which are crystalline and *gelsemoidine* which is amorphous. Other alkaloids are *sempervirine* and *gelsemine*. Methods of procedure, physical description, color reactions, and physiological actions are given in detail.—*Oliver Atkins Farwell.*

2820. Schmidt, James M., and Frederick W. Heyl. On the stability of Digitalis leaf extracts. (First paper.) Amer. Jour. Pharm. 91: 425–436. 1919.—In a study of Digitalis and its preparations the authors noted that the losses in extracts from young drugs were very irregular and that deterioration in alcoholic preparations was much greater than in the young drug itself. They also noted that the leaf contains a constituent much more stable than a second active but unstable constituent, the stable component representing 40 per cent of young dried leaf. The extracts from which the unstable constituent has been removed naturally come to an equilibrium, the activity being greater owing to the predominance of the more stable constituent. The conclusions reached seem to agree with the hypothesis that Digitoxin is the stable and the so-called Digitalein is the less stable component.—*Anton Hogstad, Jr.*

2821. Van Urk, H. W. Bijdrage tot de kennis van Pencedanum Sativum. (Pastinaca sativa, L.) [Contribution to the knowledge of Pencedanum sativum.] Pharm. Weekblad. 56: 1391–1398. 1919.—The fruit does not contain volatile bases, as claimed by Wittstein. The root is free from those substances which are present in the root of Imperatoria, which is probably related to the fact that Pastinaca is a biennial, while Imperatoria is a perennial. The root contains much fatty material, starch, cane-sugar and other sugars, and small amounts of an alkaloid (which is present in all parts of the plant) and of a crystalline substance that is insoluble in water and hensine, but soluble in ether. Glucosides are absent.—*H. Engelhardt.*

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

2822. Ritsema Bos, J. [Rev. of: Giltay, E.: "Plantenleven; proeven en beschouwingen over enige der voornaamste levensverschijnselen van de planten," 2e deel: de voortplanting. (Plant life: experiments and observations on some of the most important life phenomena of plants, part 2: reproduction.) 2 ed. J. B. Wolters: Groningen and The Hague, 1918.] Tijdschr. Plantenz. 25: 99–100. 1919.—A book dealing with the biology and physiology of plants.—*H. H. Whetzel.*

PROTOPLASM, MOTILITY

2823. KÜSTER. [Rev. of: **Die Kultur der Gegenwart, ihre Entwicklung und ihre Ziele. (Present day knowledge, its development and object.)** Herausgeg. v. P. Hinneberg. III. Teil (Mathematik, Naturwissenschaften, Medisin.) 4. Abteilung: **Organische Naturwissenschaften.** Unter Leitung von R. v. Wettstein. III. Band: Physiologie und Ökolgie. I. Botanischer Teil. Unter Redaktion von G. Haberlandt. Bearbeitet von F. Czapek, H. v. Guttenberg, E. Baur. Mit. 119 Abbild. im Text. 338 s. B. G. Teubner: Leipsig and Berlin, 1917.] Zeitschr. Allg. Physiol. Referate 18¹: 24. 1918.—From the review it appears that after a short introduction to plant physiology by CZAPEK the physiology and ecology of plants is treated in four chapters, CZAPEK discussing the nutrition of plants (p. 11–125), v. GUTTENBERG treating of growth and development (p. 126–152), as well as plant movements (p. 153–280), and E. BAUR taking up the physiology of reproduction in the plant kingdom (p. 281–329). All sections are treated as well as the nature of the work allows. However, CZAPEK's discussion of the nutrition of plants is considered the best, especially the section in which protoplasm, colloids, turgor and osmotic pressure, semipermeability and plasmolysis, ionic and molecular reactions, enzymes and poisons are considered. Many points of the most recent investigations are included in v. GUTTENBERG's treatment. BAUR's discussion of the ecology of reproduction is quite exhaustive.—*William J. Robbins.*

2824. KÜSTER, E. **Über Vitalfärbung der Pflanzenzellen.** I. [Vital staining of plant cells.] Zeitschr. Wiss. Mikrosk. 35: 95–100. 1919.—Non-transpiring organs or portions of organs of plants of normal turgescence can be stained vitally with acid colors. The transpiration stream serves to bring the stain into the neighborhood but is not regarded as instrumental in facilitating the exit of particles from the vessels into the parenchyma.—*H. G. Barbour.*

DIFFUSION, PERMEABILITY

2825. HIBINO, S. [Rev. of: HEUSSER, K. **Neue vergleichende Permeabilitätsmessungen zur Kenntnisse der osmotischen Verhältnisse der Pflanzenzelle in kranken Zustande. (New comparative measurements of permeability to ascertain the osmotic relations of diseased plant cells.)** Vierteljahrsschr. Naturforsch. Ges. Zürich 62: 565–589. 1917.] Bot. Mag. Tōkyō 33: 135–138. 1919.

2826. HIBINO, S. [Rev. of: TRONDLE, A. **Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten. (The influence of light on the permeability of the plasma-membrane, etc.)** Vierteljahrsschr. Naturforsch. Ges. Zürich 63: 187–213. 1918.] Bot. Mag. Tōkyō 33: 138–140. 1919.

WATER RELATIONS

2827. BATES, C. G. **A new evaporimeter for use in forest studies.** Monthly Weather Rev. 47: 283–294. *6 fig.* 1919.—See Bot. Abstr. 4, Entry 178.

2828. MATSUSHIMA, TANETOSHI. **Kirieda no kyūsui ni tsuite. Untersuchungen über die Wasseraufname bei abgeschnittenen Zweigen.** [Studies on intake of water by cut branches.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tōkyō 33: 65–72. 1919.—The author studied duration of water absorption in cut branches of plants of 60 species common in Japan, selected from 31 families. The cut ends were placed under water while the leaves remained in air. The duration of water intake was greater for plants with thick, evergreen leaves such as *Pinus* and *Fatsia* than for those with thin, broad leaves. Branches cut obliquely absorbed more rapidly than did those cut transversely, this being probably due to the larger surface in contact with the water in the former case. When resin, mucilage, latex or gum was present the leaves withered very quickly, since these substances hinder the entrance of water into the vessels. In such cases the burning of the cut surface made the leaves remain fresh somewhat longer, because of the carbonization of the resin, etc., and the prevention of the development of microörganisms at the cut surface.—*K. Morita.*

2829. McLean, R. C. **Studies in the ecology of tropical-rain forest; with special reference to the forests of south Brazil. I. Humidity.** Jour. Ecology 7: 5–54. *1 pl., 21 fig.* 1919.

MINERAL NUTRIENTS

2830. Buckner, G. Davis. **The composition of the ash of crab grass (Digitaria sanguinalis) as affected by the soil in which it is grown.** Jour. Amer. Chem. Soc. 41: 1384–1385. 1919.—The author, while searching for a green plant which contained a large percentage of ash, noticed that crab grass (*Digitaria sanguinalis*) grew and flourished in the middle of a limestone roadway. Comparative analyses were made of a plant grown under the above conditions and of a sample of the same species grown under normal conditions in garden soil. Due care was taken in selecting and preparing the samples. The analyses showed that the intake of inorganic material was not the same in the two specimens, i.e., the sample grown in a comparatively new limestone roadbed which was from 4–5 inches in thickness contained approximately 16 per cent less ash than did a similar sample grown in garden soil. The K_2O was 18.8 per cent less in the first mentioned sample. The sample grown in the limestone contained 22.7 per cent more P_2O_5, 44.0 per cent more CaO and 27.6 per cent MgO. The amount of silica in the two samples was approximately the same. "The outstanding feature in connection with the growth of these two samples of crab grass is that the absorption and retention of these different amounts of calcium, magnesium, phosphorus and potassium cause no observable difference in their external appearance."—*J. M. Brannon.*

2831. Krishnamurti Row, K. **The effect of salinity on the growth and composition of sugar cane varieties.** Agric. Jour. India 14: 476–493. *11* pl. 1919.—See Bot. Absts. 3, Entry 2928.

2832. Volhard, J. [Rev. of: Ehrenberg, Paul, and Otto Nolte. Der Einfluss von der Pflanza aufgenommener Manganmengen auf ihre Zusammensetzung. (Influence of absorbed manganese on plant composition.) Landw. Versuchsst. 90: 139–145. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 334–335. 1918.—The reviewer reports that with the use of manganese the authors obtained oat straw which analyzed 0.03 per cent to 0.10 per cent of manganese. The grain contained 0.0035 to 0.02 per cent of manganese. When the manganese content was 0.0139 per cent the ash was 11.0 per cent while with a content of 0.0939 per cent manganese the ash was 12.2 per cent. It was thus shown that an increase of the manganese content of plants to 0.1 per cent produces no certain appreciable changes in the composition of the incombustible matter of the plants.—*F. M. Schertz.*

PHOTOSYNTHESIS

2833. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. 1919.—The method here tested depends on the determination, by means of Fehling's solution, of the reducing power of an aqueous extract of the tissues to be studied. The preparation of the extract and the technique of the chemical determination are the main considerations. Similar lots of material (as leaves) are gathered at the beginning and end of an experiment-period and the extracts prepared from these are compared with respect to their reducing powers. The difference in reducing power (calculated) as amount of dextrose per unit of material employed) is taken to be a measure of the total net photosynthetic activity of the tissues in question, for the experiment-period.—To prepare the aqueous extract, the (fresh or dried) material is first finely subdivided and boiled in water, to extract water-soluble substances from the insoluble portion and to gelatinize starch. After cooling, the mass is digested with "Taka" diastase. The boiling and digesting process is repeated three times and the material is then boiled a fourth time, after which it is treated with lead acetate and excess of this reagent is precipitated with sodium carbonate. The solid material is then filtered out. The extract thus obtained is next boiled with dilute HCl, and NaOH is finally added to render it only slightly acid. To the resulting extract

Fehling solution is added. The precipitate formed is finally weighed and considered as copper oxide; from the amount of this the reducing power of the extract is calculated as though the latter had been a solution of dextrose. Numerous details of technique are given; each operation is to be performed in a standard manner.—The method was tested in a number of ways. Assuming that photosynthetic activity is proportional to the standardized copper-oxide differences, reckoned as dextrose-equivalents, the following are examples of the results obtained. *Phaseolus* leaves showed successively larger activity values, hour by hour, from 8 a.m. to 1 p.m., after which the values were successively smaller. The net activity of inverted *Helianthus* leaves was higher than that of leaves in the normal position. In the foliar rosette of *Taraxacum* the upper leaves showed values about twice as great as those shown by the lowest leaves. When the light intensity (as measured with photo-sensitive paper) was reduced from 100 to 10 the photosynthetic activity of *Phaseolus* leaves was correspondingly reduced from 100 to 6, while a light intensity reduction from 100 to 0.3 showed a net photosynthesis reduction from 100 to only 2.0. Stamens of *Acer nedundo* showed a net activity of about 8 mgm. of dextrose per gram of dry tissue per day. Comparisons of *Equisetum*, *Helianthus*, and *Phaseolus* showed relative transpiring powers (per areal unit) of 1580, 980, and 650, respectively, for the three plants, while the corresponding photosynthetic values were 1500, 2802, and 4491; photosynthetic power appeared to be roughly inversely proportional to transpiring power. The presence of rusts or mildews decreased the net photosynthetic activity of leaves in the cases tested; erumpent *Puccinia* reduced the activity values for *Avena* leaves from 100 to 48. A similar reduction for *Phaseolus* leaves accompanied serious infection by *Tetranychus* (red spider). [Author's abstract of this paper was preliminarily published as Physiol. Res. Prel. Abst., v. 2, no. 6, May, 1919. Full paper also appeared, reprinted without change, in limited edition, as Ph.D. dissertation from Univ. Minnesota.] [See also Bot. Abstr. 3, Entries 1375, 1452, 2685.]—*B. E. Livingston.*

METABOLISM, GENERAL

2834. ANONYMOUS. The anthocyanin pigments in plants and their chemical, physiological and biological functions. Review of a number of recent papers and books on the anthocyanin pigments of plants. Sci. Amer. Suppl. 84: 2-3, 7. 1919.

2835. APPLEMAN, C. O., AND J. M. ARTHUR. Carbohydrate metabolism in green sweet corn during storage at different temperatures. Jour. Agric. Res. 17: 137-152. 2 *fig.* 1919.—The character and kinetics of the processes involved in the rapid depletion of sugar in Stowell's evergreen sweet corn when it is picked in the milk (or edible) stage has been studied in connection with the effects of different storage temperatures on these processes. From an initial sugar content of about 4.5 to 7 per cent (3.5 to 5 per cent sucrose and 1 to 3 per cent reducing sugars) the sugar content falls off until, at equilibrium, about 1.5 per cent total sugars remain. At the point of equilibrium about 62 per cent of the total sugar and about 70 per cent of the sucrose has disappeared. At 30°C. about 50 per cent of the total sugar and 60 per cent of the sucrose is lost during the first 24 hours. The losses of total sugar in the same time at 20° and 10° are respectively about 25 per cent and 15 per cent. Until about 50 per cent of the total sugars are lost a temperature coefficient of about 2 was found for temperatures from 0° to 30°C. The loss in sugar is due primarily to a transformation to polysaccharids, chiefly starch, and even at the higher temperature, 30°C., only about 0.1 per cent of the loss was due to respiration.—*Otis F. Curtis.*

2836. ASAI, TOICHI, AND MAKATO NAKAMURO. Über einen kristallinischen Bestandteil von Gardenia florida L. [A crystalline constituent of Gardenia.] Bot. Mag. Tôkyô 33: 70-71. 1919.—The authors describe the isolation of d-mannin from the flowers of leaves of *Gardenia*. They also found a chromogen in various parts of this plant and other Ruhiaceae which colors intensely blue-green with mineral acids.—*Leonas L. Burlingame.*

2837. Benotson, Ida A. **The proteus group of organisms with special reference to agglutination and fermentation reactions and to classification.** Jour. Infect. Diseases 24: 428–481. 1919.—A detailed study of the morpbology and physiology of *Proteus vulgaris* and closely allied organisms is given. The group is characterized as follows: Rods, varying from short coccoid forms to filaments, gram negative, without endospores, witb flagella, wben present, peritrichie, aerobes or facultative anaerobes, liquefying gelatin, often producing characteristic stellate colonies, utilizing amino-acids and generally carbohydrates, and may be saprophytic or parasitic. *Proteus vulgaris* is probably most frequently associated with decomposing organic matter of animal origin, and tbe extent of its occurrence in water and soil is related to the amount of such organic matter present. Fermentation and agglutination reactions are reported in detail. An extensive bibliography is appended.—*Selman A. Waksman.*

2838. Bourquelot, Em., and M. Bridel. **Synthèses biochimiques simultanées du gentiobiose et des deux glucosides du glycol par l'émulsine.** [Simultaneous biochemical syntheses of gentiobiose and of the two (α and β) glucosides of glycol.] Jour. Pharm. et Chem. 19: 329–335. 1919.—A continuation of the authors' experiments to synthesize glucosides.—*H. Engelhardt.*

2839. Bourquelot, Em., and M. Bridel. **Application de la méthode biochimique à l'étude de plusieurs espèces d'Orchidées indigènes. Découverte d'un glucoside nouveau, la loroglossine.** [Application of the biochemical method to the study of various species of native orchids. Discovery of a new glucoside, "loroglossin."] Jour. Pharm. et Chim., 20: 81. 1919. —In 1913 the authors examined 18 species of orchids, native in France, belonging to the genera *Aceras, Cephalanthera, Epipactis, Limodorum, Loroglossum, Neottia, Platanthera, Ophrys* and *Orchis*. It was found that all these plants contained in aerial portions one or more glucosides which were hydrolyzable by emulsin. The authors succeeded in isolating from *Loroglossum hircinium*, a new glucoside which crystallizes in the form of long, colorless needles, is odorless, and possesses a very bitter taste. It melts at 137°, is levorotatory and does not reduce Fehling's solution. It is hydrolyzed by heating with dilute sulpburic acid or by emulsin.—*H. Engelhardt.*

2840. Bourquelot, Em., and H. Hérissey. **Application de la méthode biochimique à l'étude des feuilles fraîches d'Hakea laurina. Extraction de québrachite et d'arbutine.** [The biochemical method applied to the study of the fresb leaves of Hakea laurina. Extraction of quebrachit and arbutin.] Jour. Pharm. et Chim. 19: 251–255. 1919.—*Hakea laurina* R. Br., syn. *H. eucalyptoides* Meissn., is a tree belonging to the family Proteaceae. Its home is Australia, but it is cultivated in southern France as an ornamental tree. Its branches are sent to Paris in the winter under the name *Hakea* or red eucalyptus. The authors succeeded in isolating from the leaves two glucosides, quebrachit and arbutin, substances which are also present in the leaves of *Grevillea robusta* Cunn., belonging also to the family Proteaceae.—*H. Engelhardt.*

2841. Bridel, M. Marc. **Application de la méthode biochemique aux rameaux et aux écores de diverses espèces du genre Populus.** [Application of the biochemical method to the branches and barks of various species of the genus Populus.] Jour. Pharm. et Chim. 19: 429–434. *Ibid.* 20: 14–23. 1919.—By applying the biocbemical method to the branches and barks of *Populus pyramidalis* Rozier, *P. canadensis* Desf., *P. alba* L., *P. Tremula* L. and *P. nigra* L. the authors found various new sugars, which were hydrolysable by invertin. These possess both higher and lower reduction indices than saccharose and other sugars of this series, such as, gentianose, raffinose, stachyose, and verbascose. The new sugars also differed in other respects and were present both in the woody part of the trees and in the bark. A glucoside with a reduction index bigher than 400 isolated from *P. pyramidalis* exists only in the bark. A glucoside witb a low reduction index isolated from *P. nigra* also exists in the bark only. The glucoside in *P. canadensis*, also present in the bark only, is probably salicin, which is likewise present in the bark of *P. alba* and *P. Tremula*. The woody part of these two species contains a glucoside which seems to be identical with that present in the bark of *P. nigra.*—*H. Engelhardt.*

2842. BUSOLT, ERNST. **Beiträge zur Kenntnis der Kohlenhydrate der Gemüsearten** [The carbohydrate of vegetables.] Jour. Landw. 64: 357. 1916.]—Mannitol was found in the watery extract of asparagus, green beans, peas, cauliflower, and cabbage. Grape sugar was found in cabbages, carrots, and green peas. Fructose and glucuronic acid were liberated from peas. [Based on Blanck's review in Biedermann's Zentralbl. Agrikulturchem. 47: 287. 1918.]—*F. M. Scherts.*

2843. COBOLEY, A. B. **Possible cause of "sour sap" in the Pacific Northwest.** Better Fruit 13[11]: 6, 30–32. May. 1919.—See Bot. Absts. 3, Entry 2325.

2844. ESMARCH, F. **Zur Kenntniss des Stoffwechsels in blattrollkranken Kartoffeln.** [Metabolism in potato leafroll.] Zeitschr. Pflanzenkrankh. 29: 1–20. 1919.—See Bot. Absts. 3, Entry 2630.

2845. FOLIN, O., AND E. C. PECK. **A revision of the copper phosphate method for the titration of sugar.** Jour. Biol. Chem. 38: 287–291. 1919.

2846. HAAS, A. R. C. **Colorimetric determinations of the hydrogen ion concentration in small quantities of solution.** Jour. Biol. Chem. 38: 49–58. 1919.—Lacmoid paper was successfully used for approximate determination of P_H values in small quantities of solution. This may be supplemented by use of the spot plate method. The P_H values obtained by these methods differ by 0.4 to 0.2 from those obtained by more exact methods such as the electrometric or the usual Sörensen colorimetric method.—*George B. Rigg.*

2847. HESS, A. F., AND L. J. UNGER. **The scurvy of guinea pigs. III. The effect of age, heat and reaction on antiscorbutic foods.** Jour. Biol. Chem. 38: 293–303. 1919.—Canned tomatoes are an excellent anti-scorbutic. Boiling decreases, but does not destroy, their efficiency. Under certain conditions orange juice loses its antiscorbutic property when rendered slightly alkaline. The same rule seems to hold for alkalinization as for heating; i.e., the length of time the antiscorbutic food is subjected to the deleterious influence is fully as important as the intensity of the process.—*George B. Rigg.*

2848. JENNINGS, DAVID S. **Effect of certain colloidal substances on the growth of wheat seedlings.** Soil Sci. 7: 201–215. 1919.—See Bot. Absts. 3, Entry 2945.

2849. JONES, H. M. **A rapid hydrogen electrode method for determination of hydrogen-ion concentration in bacterial cultures or in other turbid or colored solutions.** Jour. Infect. Diseases 25: 262–268. 1919.—A new hydrogen electrode vessel is described which is easily constructed, is accurate at least to 0.01 P_H and gives rapid saturation with hydrogen gas. A technic is described combining the indicator and the gas-chain methods, greatly simplifying the procedure, especially where a large number of determinations are to be made.—*Selman A. Waksman.*

2850. KENDALL, E. C. **Isolation of the iodine compound which occurs in the thyroid.** Jour. Biol. Chem. 39: 125–147. 1919.

2851. KENDALL, A. I., A. A. DAY, A. W. WALKER, AND M. RYAN. **The fermentation reactions of certain streptococci. XLII. Studies in bacterial metabolism.** Jour. Infect. Diseases 25: 189–206. 1919.—With the isolation of 356 cultures of organisms from cases of pneumococcus pneumonia, from empyemas, blood cultures, and autopsies, and also obtained from several institutions, the various organisms were compared in regard to their ability to ferment certain carbohydrates and their derivatives. A relation exists between the stereo-isomerism of members of the various groups of carbohydrates having the same empirical formula, and their utilisation by different types of bacterin. The fermentation reactions of the bacteria afford a means of their identification. The bacteria, including the streptococci, can therefore conveniently be classified into groups on the basis of fermentation reactions.

It is suggested that the specificity of the carbohydrate reactions induced by bacteria may be used as delicate tests of important theories relating to carbohydrates, as, for example, the formation of enols and of tautomerism. No relationship seems to exist between cultural grouping based on the fermentation of carbohydrates and pathogenesis.—*Selman A. Waksman.*

2852. Mach, F., and P. Lederle. Die Verwendung von Titantrichlorid in der analytischen Praxis. [Use of titanium trichloride in analytical practice.] Landw. Versuchsst. 90: 191–224. 1917.—The author recommends some changes and simplifications in the Rhead-Moser method of titrating copper. The method is extended to estimate the cuprous oxide set free in sugar determinations, hydrogen peroxide, and the iron in iron sulphate. The necessary solutions and conditions for titration as well as the apparatus required are given in the review mentioned below. [Based on Volhard's review in Biedermann's Zentralbl. Agrikulturchem. 47: 295–297. 1918.]—*F. M. Schertz.*

2853. McClendon, J. P., and P. F. Sharp. The hydrogen ion concentration of foods. Jour. Biol. Chem. 38: 531–534. 1919.—Vitamines deteriorate more rapidly in alkalins than in acid media. All foods examined, both of plant and animal origin were on the acid side of neutrality.—*George B. Rigg.*

2854. McCollum, E. V., N. Simmons, and H. T. Parsons. Biological analysis of pellagra-producing diets. VI. Observations on the faults of certain diets comparable to those employed by man in pellagrous districts. Jour. Biol. Chem. 38: 113–146. 1919.—The legume seeds, notwithstanding their high protein content, do not appreciably improve diets that predispose to pellagra, because of the poor quality of their protein and their failure to supplement a diet derived from vegetable foods of the storage tissue class in other respects (e.g., fat-solubls A). The prevalence of pellagra in certain parts of the South is in large part corrected with the growing of cash crop (cotton) and purchasing from the retail store foods among which are many made from degerminated and decorticated parts of grains. Food products that can be handled commercially without hazard are not in general satisfactory food stuffs unless properly supplemented with certain others which correct their deficiencies. —*George B. Riggs.*

2855. Okey, Ruth. Studies on the behavior of inulin in the animal body. Preliminary paper. Application of the Benedict method to the estimation of levulose and inulin. Jour. Biol. Chem. 38: 33–42. 1919.—Benedict's modification of the Lewis-Benedict method has been used successfully for the determination of levulose, and of levulose in the presence of inulin.—*George B. Rigg.*

2856. Osborne, T. B., and L. B. Mendel. Nutritive factors in plant tissues. II. The distribution of water-solubls vitamins. Jour. Biol. Chem. 39: 29–34. 1919.—The indispensable food factor known as water-soluble vitamine is widely distributed in naturally occurring food products. Its presence in the seeds of cereals and of a number of legumes is well known. Among products recently shown to contain it are cottonseed, millet seed, flaxseed, kaffir corn, hempseed, cabbage, alfalfa, clover, timothy, and spinach.—*George B. Rigg.*

2857. Thomas, E. E. Frozen lemons and oranges for by-products. California Citrograph 4: 78, 81, 104. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2374.

2858. Tschirch, A. Die Lokalisation der chemischen Arbeit in der Pflanze. [The localization of chemical work in the plant.] Mitteil. Naturforsch. Ges. Bern 1917: 138. 1917.] —Not only the protoplasm but also the cell wall can do chemical work. This is deduced from the fact that some secretions, such as wax and ethereal oils, are not found within the cell. The cell sap also does chemical work, as the layer of protoplasm in the epidermis is so small in amount that only enzyme production can be assigned to it. The alkaloids occur chiefly in the epidermis, the bundle sheath, and the medullary rays. They are lacking, as

rule, in specific assimilating tissue, such as the palisade tissue, and are not found in the vascular bundles. The decomposition products of the proteins which might prove harmful are removed by being fixed as alkaloids. The basic materials are formed in the assimilating tissue and transported to storage organs and to the places where they are used. The waste material is laid down in the epidermis, in the bundle sheath, and in the "physiologically dead" tissue. [Based on Lipschütz' review, *Zeitschr. Allg. Physiol. Referate* 18: 25–27. 1919. —*William J. Robbins.*

2859. TUTTLE, GWYNETHE M. Induced changes in reserve materials in evergreen herbaceous leaves. Ann. Botany 33: 201–210. 7 *fig.* 1919.—The author, after first considering the general features of plants with winter reserves in the form of starch and fat respectively in the cold regions of northwestern Canada, records a series of experiments with *Linnaea borealis* L. var. *americana* (Forbes) Rehder, concerned with inducing changes in the reserve material. *Linnaea* passes the winter with oil as the reserve and no starch. Artificial exposure to higher temperature in darkness during January resulted in the disappearance of oil and the re-appearance of starch in two days. The starch disappears when again exposed to moderately low temperature for about 8 days, but the leaves are killed if exposed to extremely low temperature when filled with starch. A decrease in the oil content is evident in leaves which have formed starch by conversion. The presence of lipase was demonstrated in material undergoing conversion. Oxidases are present in the leaf at rather low temperatures.—*F. J. Lewis.*

2860. WAKSMAN, SELMAN A. Studies in the metabolism of Actinomycetes. II. Jour. Bact. 4: 307–330. 1919.—In this paper the author reports the results, as well as the methods employed, of growing several different species of *Actinomyces* upon egg media, gelatin, and media containing different carbohydrates. *Organisms which produce proteolytic enzymes* when grown in milk or on coagulated blood serum hydrolize the coagulated egg-albumen and also liquefy gelatin rapidly. The *liquefication of gelatin is not a specific characteristic* of the forms studied since nearly all liquefied this medium more or less. The rapidity of liquefication, however, and the amino nitrogen content of the liquefied gelatin showed differences in the different organisms. Several organisms produced brown to black pigment on the egg medium, probably due to the production of the enzyme tyrosinase acting upon certain egg constituents. In determining the utilization of fourteen different carbon compounds by twenty-seven different organisms it was found that starch is probably the best source of energy for most Actinomycetes next in order follow glucose, lactose, maltose, glycerin, sucrose, cellulose, and organic acids; it is probable that the utilization of the carbohydrate is affected by the source of the nitrogen used in the metabolism. The reaction upon the various carbohydrates was determined by the changes in hydrogen-ion concentration. [See also Bot. Abstr. 3, Entry 2883.]—*Chester A. Darling.*

2861. WILLIAMS, R. J. The vitamine requirement of yeast. A simple biological test for vitamine. Jour. Biol. Chem. 38: 465–486. 1919.—The water-soluble, beri-beri-preventing vitamine, relatively so abundant in yeast, is necessary for the nutrition of yeast cells themselves. The fat-soluble vitamine apparently has no effect on yeast growth. The growth of yeast cells may be used as a simple biological test for vitamine.—*George B. Rigg.*

2862. WILLSTÄTTER, RICHARD, OTTO SCHÖPFLI, AND ERWIN W. MAYER. Untersuchungen über Chlorophyll (von Richard Willstätter) XXV; Über Phytol II. [Investigations upon chlorophyll; concerning phytol II.] Ann. Chem. [Liebig] 418: 121–147. 1919.—WILLSTÄTTER and his co-workers have previously isolated phytol from chlorophyll and identified it as an unsaturated primary alcohol, corresponding to the formula $C_{20}H_{39}OH$. Failure of the compound, and most of its derivatives, to crystallize has led to the use of its ether-soluble sodium salt, phenyl and α-naphthyl urethane, and the peculiar solubility of the silver salt of its phthalic acid ester, for purposes of identification. The latter, on heating with soda-lime, produces a saturated carboxy acid, "phytan säure." This acid is easily converted into an

isomeric lactone, showing the attachment of alkyl groups to the α and β carbon atoms, with double linkage between these atoms. The double linkage of raw (α) phytol is between the fifth and sixth carbon atoms, while that of distilled (β) phytol (probably a geometrically isomeric form) is between the seventh and eighth carbon atoms. Oxidation of phytol, either by way of the osonide or by means of chromic acid, gives a series of ketones and acids. The ketone products approximate the formula $C_{18}H_{36}O$, but contain an excess of oxygen. It is probable that oxygen occurs in places other than the double linkage of these compounds. The ketone fraction is best purified by means of the crystalline 1-naphthyl-hydrazine-4-sulfonic-acid derivative. Purification of this product by way of the semi-carbazide indicates the formula of the principal ketone to be $C_{18}H_{34}O$, yielding the fatty acid $C_{18}H_{32}O_2$ by oxidation. Procedure involves adding the potassium salt of the hydrazine sulfonic acid to a dilute methyl alcohol solution of the ketone, washing with ether and hydrolysing with either 17 per cent sulfuric acid or pyroracemic acid. The semi-carbazone eliminates the excess of oxygen resulting from the oxidation of the original phytol. Besides formic acid, the chief acid products range from $C_{16}H_{32}O_2$ to $C_6H_{12}O_2$. Absence of normal chain compounds from the products of oxidation renders the previously proposed simple chain formula of phytol improbable. It is proved that its carbon framework is multibranched.—*W. E. Tottingham.*

2863. Yamaguchi, Y. [Rev. of: H. C. Sampson: Chemical changes accompanying abscission in Coleus blumei. Bot. Gaz. 66: 32–53. 1918.] Bot. Mag. Tôkyô 33: 52–54. 1919.

METABOLISM (NITROGEN RELATIONS)

2864. Benton, A. G. Studies in the nitrogen metabolism of bacteria. Jour. Infect. Diseases 25: 231–247. 1919.—The proteolytic action of four bacteria (*B. proteus, B. pyocyaneus B. typhosus*, and *Staphylococcus*) was studied; they were all found to be strongly proteolytic, destroying coagulata protein in media containing ascitic fluid. The course of proteolysis was followed by the determination of amino-nitrogen by the method of Van Slyke. The ability of a given cell to assimilate amino-acids does not result directly from the simplicity of structure and solubility of these compounds in water. The nature of the particular protein decomposition products present plays a very important part in metabolism, as the power to assimilate a given amino-acid is not necessarily common to all bacteria—but is due to factors which may be absent in some varieties. The avidity with which an organism attacks a protein would be in direct proportion to the amount and variety of free amino-acids present which are represented in the structure of the protein molecule and which that particular kind of cell can assimilate.—*Selman A. Waksman.*

2865. Birckner, V. Acidimetric titrations of grain extracts and amino-acids in the presence of alcohol. Jour. Biol. Chem. 38: 245–254. 1919.—Amino-acids, which in aqueous solution are nearly neutral to phenolphthalein, react distinctly acid in the presence of alcohol.—*George B. Rigg.*

2866. Dutcher, R. A. Vitamins studies. IV. Antineurotic properties of certain physiological stimulants. Jour. Biol. Chem. 39: 63–68. 1919.—Epichitosamine has been prepared. It seems to be an x-amino sugar. Its epimer, chitosamine, has been prepared from chitosaminic acid by the action of pyridine.—*George B. Rigg.*

2867. Hart, E. B,. and H. Steenbock. Maintenance and production value of some protein mixtures. Jour. Biol. Chem. 38: 267–273. 1919.—It is now well known that the efficiency of a protein mixture in growth production will depend upon the quantitative and qualitative make-up of its amino-acid content. A greater utilization of a poor protein mixture can be accomplished by adding to it some single protein or a mixture of proteins with proper supplementing qualities. The efficiency of cereal grains of low production value may be increased by the addition of flaxseed meal in such proportion that 20 to 25 per cent of the proteins come from the flaxseed meal and 75 to 80 per cent from the cereal.—*George B. Rigg.*

2868. JOHNS, C. O., AND A. J. FINKS. **Lysine as a hydrolytic product of hordein.** Jour. Biol. Chem. 38: 63–66. 1919.—The basic amino acids found in hordein, the alcohol-soluble protein of barley (*Hordeum vulgare*) are cystine, arginine, histidine and lysine. Lysine has not before been shown to be present in this protein. The percentages of the different basic amino acids in hordein are almost the same as those found in gliadin, the alcohol-soluble protein of wheat. The free amino nitrogen in hordein was found to be equal to one-half of the lysine nitrogen.—*George B. Rigg.*

2869. JOSHI, N. V. **Rate of nitrification of different green manures and parts of green manures and the influence of crop residues on nitrification.** Agric. Jour. India 14: 395–413. 1919.—See Bot. Absts. 3, Entry 2937.

2870. MCCLENDON, J. F., AND H. J. PRENDERGAST. **Note on the ultra microscopy of egg albumen.** Jnur. Biol. Chem. 38: 549. 1919.—When egg albumen was recrystallised three times and a saturated solution of the crystals was made in distilled water, only a few submicrons were found. They are believed to be due to slow precipitation. The more that is known of the physical chemistry of proteins, the less they appear to resemble the suspension colloids, and it seems unfortunate that clear solution of proteins should be classed with suspensoids under the term "colloids."—*George B. Rigg.*

2871. OSBORNE, T. B., AND L. B. MENDEL. **The nutritive value of yeast protein.** Jour. Biol. Chem. 38: 223–227. 1919.—Rats were successfully kept for more than a year, covering the period of growth, upon a diet in which yeast furnished the sole source of nitrogen as well as water-soluble vitamine.—*George B. Rigg.*

2872. OSBORNE, T. B., A. J. WAKEMAN, AND EDNA L. FERRY. **Preparation of protein free from water-soluble vitamine.** Jour. Biol. Chem. 39: 35–40. 1919.—Many proteins, especially casein, can easily be prepared so free from water-soluble vitamines that animals fed on them decline in weight within a few days, unless some other source of this food factor is supplied. Edestin is an example of a plant protein that has been so prepared. The chemical nature of vitamines is wholly unknown.—*George B. Rigg.*

2873. PATTEN, N. E., AND A. J. JOHNSON. **The effect of hydrogen ion concentration on the liquefaction of gelatin.** Jour. Biol. Chem. 38: 179–190. 1919.—The setting of gelatin is influenced by the hydrogen ion concentration of the medium, and unless the gelatin is destroyed this effect is probably reversible. Gelatin in the concentrations used is not without effect upon the buffer solutions, displacing the P_H in such a manner as one would expect from an aggregate of amino-acids acting amphoterically.—*George B. Rigg.*

2874. SCHOUTEN-ILCKEN, W. S. J., AND R. W. TUINZING. **Die Bestimmung des Ammoniakstickstoffs in Düngstoffen auf Iodometrischem Wege. [Estimation of nitrogen as ammonia in fertilizers by the iodometric method.]** Landw. Versuchsst. 89: 233. 1917.—The time-consuming and expensive method of distilling with magnesia was discarded at the experiment station and the authors suggest in place of it the use of iodometric methods. Chemical reactions and method of procedure are given in the abstract. Data submitted indicates the accuracy of the method. [Based on Volhard's review in Biedermann's Zentralbl. Agrikulturchem. 47: 297–299. 1918.]—*F. M. Schertz.*

2875. SHERMAN, H. C., J. C. WINTERS, AND V. PHILLIPS. **Efficiency of oat** adult **human nutrition.** Jour. Biol. Chem. 39: 53–62. 1919.—In practical dietetics equal weights of oat and maize proteins may be regarded as essentially equal in value. Small amounts of milk will apparently so supplement these that their efficiency is comparable with that of the average protein of a mixed diet.—*George B. Rigg.*

2876. VOLHARD, J. [Rev. of: PFEIFFER, TH. AND W. SIMMERMACHER. **Über die Wirkung des Dicyandiamids auf das Pflanzenwachstum. (The action of dicyanodiamide on the plant growth.)** Landw. Versuchsst. 90: 415–430. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 243–246. 1918.—See Bot. Absts. 3, Entry 1792.

2877. Wunschendorff, H. E. **Les matières protéiques de la graine menugrec.** [The protein substances in fenugreek (Trigonella) seed.] Jour. Pharm. et Chim. 20: 86–88. 1919.—The seeds contain about 27 per cent of proteins, which consist of 25 per cent of a globulin, 20 per cent of α and β albumin and 55 per cent of a nucleoprotein. The latter is rich in phosphorus (1.58 per cent) and iron (3.39 per cent).—*H. Engelhardt.*

METABOLISM (ENZYMES, FERMENTATION)

2878. Draubert, —. **Los vinos atacadas de "casse brune."** [Wines attacked by "casse brune."] Informacion Agric. [Madrid] 9: 130–132. 1919.—An account is given of the disease of wine known as *casse brune*, said to be due to oxidation. Fungi are sometimes present. Chemical methods of correcting diseased wines are outlined.—*John A. Stevenson.*

2879. Falk, G. K., Grace McGuire, and Eugenia Blount. **Studies in enzyme action. XVII. The oxidase, peroxidase, catalase, and amylase of fresh and dehydrated vegetables.** Jour. Biol. Chem. 38: 229–244. 1919.—The activity of oxidase, peroxidase, catalase, and amylase in cabbage, carrots, potatoes, and tomatoes was determined. The vegetables were tested in 3 conditions; fresh, air-dehydrated, and vacuum-dehydrated. In general, the activity of oxidase, peroxidase, and catalase was better in more alkaline solutions. The activity was best between P_H 7 and 10, but there is no well-defined maximum. Activity was inhibited in acid solution, P_H 2 and 3 for oxidase and peroxidase and P_H 4 for catalase, except in the case of tomato. Vacuum-dehydrated cabbage and carrot gave stronger oxidase reactions than did the fresh. In every other case the enzyme action was less in the juice from dehydrated vegetable than in that from the fresh. Enzyme activity was less in air blast material than in vacuum material. Well defined maxima in the amylase actions were observed with cabbage, carrot, and white turnip juices at about P_H 6. With yellow turnip juice the optimum action extended from P_H 4 to 7. The enzymes are inactivated by heating in solution for a short time, while food hormones (vitamines, antiscorbutic property, and growth-producing property) are not. The changes that take place in food hormones on their "inactivation" may be considered chemical in their character.—*George B. Rigg.*

2880. Popp, M. **Die Inversion von Saccharose durch Invertase. Eine verbesserte Methode zur Bereitung von starken Invertaseiösungen aus Presz-oder Bierhefe.** [Rev. of: Hudson, C. S. The inversion of sucrose by invertase. VIII. An improved method for preparing strong invertase solutions from top or bottom yeasts. Jour. Amer. Chem. Soc. 36: 1566–1571. 1914.] Biedermann's Zentralbl. Agrikulturchem. 47: 276–277. 1918.—The reviewer emphasizes the following: A method for preparing a stock solution of invertase is described. Such a solution keeps well (1 month or more), has a definitely known and high inverting power and is quite free from impurities. The method of preparation consists in kneading the yeast with tap water and toluene at room temperature, autolyze for several (4–5) days, purify with lead acetate and hydrogen sulphide and then dialyze. The prepared solution is colorless, odorless and tasteless.—*F. M. Schertz.*

2881. Tokugawa, Yoshichika. **Kaki no dasshi ni tsuite. On the destringency in the fruit of Diospyros Kaki.** [Title in Japanese and English, text in Japanese.] Bot. Mag. Tôkyô 33: 41–44. 1919.—Astringency of unripe persimmons is due to the existence of tannin as a jelly-like substance in idioblasts of fruit. When ripening occurs astringency decreases and finally disappears, and the fruit becomes sweet. Loss of astringency is the result of hardening of the jelly-like content of the idioblasts so that the tannin becomes insoluble in saliva; it is not the result of the removal or oxidation of the tannin. The tannin found in persimmons is coagulated into jelly by formalin, hydrochloric acid, or sulphuric acid.—*K. Morita.*

2882. Van Laer, Henri. **Actions entre enzymes.** [Interactions of enzymes.] Zeitschr. Gärungsphysiol. 6: 169–175. 1918.—Van Laer reports some observations on the nature of zymogens and the findings are claimed to be in confirmation of the results of Forn and

GUTHRIE who had shown that the increase of the amyloclastic activity of papain with barley meal is not manifested when the infusion is kept in direct contact with the proteoclastic ferments. The yeast infusions were obtained from yeast prepared according to the Lebedeff method.—The addition of papain to yeast juice destroyed the catalase and zymase. In the state of zymogens there was shown greater stability and resistance to the factors of inactivation. The hefanol extract of yeast in the presence of antiseptics showed a measurable degree of inverting activity. This inverting agent was amylase.—The diastase and papain had no influence upon the hefanol infusion even after a digestion of 24 hours.—Observation is made upon the intensity of autofermentation. After the latter there remains some amylase which is sensitive to papain. This sensitiveness is expressed by the data showing the decrease of the per cent of sugar inverted from 25.6 to 19 when papain was added.—Certain cellular materials, as soluble or incoagulable protoplasmic products, decreased the activity of sucrase according to the concentration. In the presence of small quantities of these substances the rapidity of hydrolysis of saccharose is hardly modified. Extracts of yeasts, inactivated by acetone, give a notable increase of inverting power when added to a solution of papain or active amylase, the yeast cells in this respect behaving like cellular bodies. The above increase is due on the one hand to the increase of sucrase and on the other to the decrease of cellular substance into the digestion products.—*A. M. Gurjar.*

2883. WAKSMAN, SELMAN A. Studies in the metabolism of Actinomycetes. [I.] Jour. Bact. 4: 189–216. 1919.—Forty-two different species of *Actinomyces*, many of which were isolated from the soil, were used in the investigation. These were grown on three different culture media: milk, blood agar, and Loeffler's blood serum. The greatest variation in the characters of the different species occurred in milk, the author being able to divide the species tested into five groups depending upon the coagulation of the casein in milk and the peptonization of the coagulum. Several tests were made and the conclusion reached that two different enzymes were operative in bringing about these reactions,—a rennet-like enzyme and a proteolytic enzyme. When the organism was grown in Czapek's synthetic solution the rennet-like enzyme appeared to be dissolved out into the medium, while the proteolytic enzyme was kept largely within the mycelium of the organism. Hemolysis on the blood agar and liquefication of the coagulated blood serum were brought about by species which produced the proteolytic enzyme. [See also Bot. Abstr. 3, Entry 2860.]—*Chester A. Darling.*

METABOLISM (RESPIRATION)

2884. BUTLER, O. Effect of wounds on loss of weight of potatoes. Jour. Amer. Soc. Agron. 2: 304–305. 1919.—See Bot. Abstr. 3, Entry 1861.

ORGANISM AS A WHOLE

2885. DEY, P. K. Studies in the physiology of parasitism. V. Infection by Colletotrichum Lindemuthianum. Ann. Bot. 33: 305–312. *Pl. 12.* 1919.—See Bot. Abstr. 3, Entry 2618.

2886. HAAS, A. R. C., AND E. B. FRED. Effect of soybean germination upon the growth of its nodule-forming bacteria. Soil Sci. 7: 237–245. *1 pl., 2 fig.* 1919.—See Bot. Abstr. 3, Entry 2936.

2887. LOHR, P. J. Onderzoekingen über die Blattanatomie von Alpen-und Ebenenpflanzen. [Investigations on the leaf anatomy of alpine and prairie plants.] Rec. Trav. Bot. Néerland. 16: 1–62. *Fig. 1a–4b (8), tab.* 1919.—See Bot. Abstr. 4, Entry 240.

2888. MCATEE, W. L. Summary of notes on winter blooming at Washington, D. C. Proc. Washington [D. C.] Biol. Soc. 32: 129–132. 1919.—See Bot. Abstr. 4, Entry 246.

2889. MacDougal, D. T., and H. A. Spoehr. **The origination of xerophytism.** Plant World 21: 245–249. 1918.—The authors discuss the direct effects of aridity on carbohydrate metabolism, and conclude that both succulence and xerophytism are the result of a low water supply in the cells, which induces more rapid transformations of the polysaccharids in one direction or another. If this accelerated transformation is toward the pentosans or mucilages, succulence results. But if conversion is toward the anhydrous substances like cellulose and other wall forming materials, xerophytism results. Changes may occur in both directions in the same plant, as in massive cacti, where the epidermal structures are xerophytic, and the cortical regions succulent.—*Chas. A. Shull.*

2890. Northrop, J. H., L. H. Ashe, and J. K. Senior. **Biochemistry of Bacillus acetoethylicum sp. nov. with reference to the formation of acetone.** Jour. Biol. Chem. 39: 1–21. 1919.—An organism has been isolated and described which produces acetone and ethyl alcohol with smaller amounts of higher alcohols from starch or sugar. Optimum cultural conditions have been determined and a semi-continuous method for carrying on the fermentation has been described. Other workers have described several organisms as producing acetone and at least two such organisms have been used on a commercial scale.—*George B. Rigg.*

2891. Pickering, Spencer. **The action of one crop on another.** Jour. Roy. Hortic. Soc. 43: 372–380. *Fig. 54–59.* 1919.—See Bot. Absts. 3, Entry 1773.

2892. Popp, M. [Rev. of: Wagner, R. J. **Wasserstoffionenkonzentration und natürliche Immunität der Pflanzen.** (Hydrogen-ion concentration and natural immunity of plants.) Centralbl. Bakt. II, 33: 708–719. 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 258–259. 1918.—See Bot. Absts. 3, Entry 1668.

GROWTH, DEVELOPMENT, REPRODUCTION

2893. Blackman, V. H. **The compound interest law and plant growth.** Ann. Botany 33: 353–360. 1919.—The growth of an annual plant, at least in its early stages, is reported as following approximately the "compound interest law"—the weight of the seed, the efficiency in the production of new material, and the period of growth corresponding to initial capital, rate of interest, and period of time, respectively. From this, a simple equation is deduced, capable of expressing the growth of active, annual plants.—*R. W. Webb.*

2894. Mitra, M. **Discussion of winter pruning vs. summer pruning.** Better Fruit 13[1]: 8, 26. May, 1919.—See Bot. Absts. 3, Entry 2350.

2895. Simbo, Ippo. **Hompo-san nisan no chûei: Kwansuru Kenkyû. Beiträge zur Kenntnis einiger einheimischen Pflanzengallen in Japan.** [Studies on some plant-galls in Japan.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tôkyô 33: 1–12. 1919.—The author describes the galls on *Rhus javanica* caused by insects (*Schlechtendalia* sp. and *Nurudeopsis* sp.). He considers their classification and their morphological and histological characters as well as their development. Starch, sugar, fat, a trace of volatile oil, and considerable quantities of tannin are found in the galls, while albumin and calcium oxalate can be demonstrated only in early stages of their development.—*K. Morita.*

2896. Stark, P. [Rev. of: Vöchting, H. **Die Polarität der Gewächse.** (Polarity of plants.) Tübingen, 1918.] Zeitschr. Allg. Physiol. 18[2]: 29–30. 1919.—The reviewer points out that this work is volume 2 of Vöchting's investigations on the experimental anatomy and pathology of plants and that it is his last work. Special attention is directed to the pathological changes which occur in the anatomy of roots and shoots grown with abnormal orientation. A statistical study of the cell length in various regions of the stem of normal plants showed that the average cell length increased from year to year, at first rapidly, then more slowly. In *Salix fragilis* the increase in the first 11 years was from 34.8 to 70.8 units. In the next 56 years the value increased to 89.1 units. In horizontally placed or inverted twigs the

values decreased. The tumors which occur on inverted plants of *Salix fragilis* at the base of new branches are due to the fact that the root pole of the cells of the new twig is in juxtaposition to the root pole of the cells of the original plant. For normal growth dissimilar poles should meet.—*William J. Robbins.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2897. STARK, P. [Rev. of: LUNDEGARDH. Ueber Beziehungen zwischen Reizgrösze und Reaktion bei der geotropischen Bewegung und über den Autotropismus. (On the relation between the intensity of the stimulus and the reaction in geotropic movement, and on autotropism.) Bot. Notiser 1918: 65–118. 1918.] Zeitschr. Allg. Physiol. Referate 18: 27–29. 1919.—The reviewer points out salient features of the paper which may be summarised as follows: (1) BACH AND PEKELHARING have shown that evident geotropism occurs when the product of the intensity of the stimulus and the time reaches a certain constant value. (2) According to TRONDLE the intensity (i) of the stimulus and the reaction time (T) can be expressed by a mathematical formula, $i(T-k) = i_1(T_1-k)$. (3) LUNDEGARDH finds that the magnitude of the angle of rotation of a root is proportional to the presentation time and also to the intensity of the stimulus. The proportion does not hold for the longer presentation times nor for the larger values of the intensity of the stimulus. If the amount of stimulus (rm) is considered to be the product of the intensity and the presentation time, then the greater the amount of stimulus the more rapidly (v) the angle of rotation reaches a certain value. This can be expressed $rm\ r_1m_1 = v-k/v_1-k$, where k is a constant.—*William J. Robbins.*

GERMINATION, RENEWAL OF ACTIVITY

2898. CHARLES, MRS. M. E. S. Germination of wild cucumber. Amer. Bot. 25: 66. 1919.—See Bot. Abstr. 3, Entry 2244.

2899. POPP, M. [Rev. of: URBAN, J., AND E. VITEK. Untersuchungen über die Keimfähigkeit des Rübensamens. (The germination of beet seed.) Zeitschr. Zuckerindust. Böhmen 40: 295–300. 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 267–269. 1918.—From the account of the reviewer the chief results are as follows: (1) Influence of low temperature on germination. Dry well-ripened beet seed were placed in liquid air (−180°C.) and left for about one-half hour or until the liquid evaporated. They were then germinated between blotters at a temperature of 20–30°C. The frozen seed were not injured by the low temperature and 95 per cent of them germinated. Experiments were also conducted on moist seed at low temperatures similar to the above and it was found that the seed germinated poorly. If the beet seed at harvest are moist, the power of germination of the seed is conserved by drying artificially. (2) *Method of germinating.* Germination on filter paper gave far better results (1–13 per cent) than sand beds.—*F. M. Scherlz.*

2900. RUSSELL, G. A. Effect of removing the pulp from camphor seed on germination and the subsequent growth of the seedlings. Jour. Agric. Res. 17: 223–238. *Pl. 20–21.* 1919. —The usual method of planting the seed of the camphor tree without removing the pulp has resulted in a very low per cent of germination. Russell has found that the removal of the pulp before planting has resulted in hastening the germination by about two weeks and increasing the germination about 525 per cent. Chiefly because of earlier germination, removal of the pulp from the seed results in an increase in the number of seedlings of transplanting size by about 600 per cent. The resulting seedlings are also larger as shown by measurements of stems, roots, and crowns. Seeds dried at 55°C. failed to germinate, as did also those dried in an attic for several weeks. Seeds soaked in 5 per cent sulfuric acid after removal of the pulp failed to germinate. Seeds fermented in a closed jar for 35 days failed to germinate. Freezing during three successive nights when the temperature fell to 20°F. reduced the germination by about 50 per cent. Soaking seeds in water for ½ hour at 25° and

50° had no effect on germination. Seeds taken from the ground showed less vitality than those picked from the tree, but removal of the pulp increased and hastened germination.—*Otis F. Curtis.*

2901. Stapledon, R. G., and Margaret Adams. **The effect of drying on the germination of cereals.** Jour. Bd. Agric. Great Britain 26: 364–381. 1919.—See Bot. Absts. 3, Entry 1889.

REGENERATION

2902. Nagai, Isaburo. **Induced adventitious growth in the gemmae of Marchantia.** Bot. Mag. Tôkyô 33: 99–109. *5 figs.* 1919.—Gemmae treated with 10 per cent KNO_3 (and similar hypertonic solutions) exhibited many cells plasmolyzed but not killed. When these plasmolyzed gemmae were cultivated in Knop's solution some cells died and the growing points were usually decidedly retarded. When apical growth was strongly inhibited numerous superficial cells became active and produced adventitious growths, varying from filaments to heart-shaped thalli. A decided positive correlation was found to exist between apical retardation and adventitious growth. Starch is formed abundantly in the old cells of the gemmae but not in those arising from the apical meristem subsequent to treatment. Drying and mechanical injury were found not to be effective stimuli in the production of adventitious growth. The author concludes from this that plasmolysis alters the structure of the protoplasm in such a way as to cause a 90° rotation of the axis of growth.—*Leonas L. Burlingame.*

TEMPERATURE RELATIONS

2903. Chandler, W. H. **Winter injury in New York State during 1917–1918.** Proc. Amer. Soc. Hortic. Sci. 15: 18–24 (1918). 1919.—See Bot. Absts. 2, Entry 723.

2904. Fryer, J. R. **Germination of oats exposed to varying degrees of frost at different stages of maturing.** Agric. Gaz. Canada 6: 337–339. 1919.—See Bot. Absts. 3, Entry 1362.

2905. Lauritzen, J. I. **The relation of temperature and humidity to infection by certain fungi.** Phytopath. 9: 7–35. 1919.—See Bot. Absts. 3, Entry 2679.

2906. Malte, M. O. **Sugar content and its relation to winter hardiness.** [Rev. of: Akerman, A., Hj. Johansson, and B. Platon. Jour. Swedish Seed Assoc., 1918.] Agric. Gaz. Canada 6: 329–331. 1919.—See Bot. Absts. 3, Entry 1380.

2907. McBeth, I. G., and J. R. Allison. **Recent investigations in orchard heating.** California Citrograph 4: 51, 65, 67. *5 fig.* 1919.—See Bot. Absts. 3, Entry 2346.

RADIANT ENERGY RELATIONS

2908. Goodspeed, Thomas Harper. **Notes on the germination of tobacco seed, III.** Univ. California Publ. Bot. 5: 451–455. 1919.—The author finds that, contrary to statements often made, the seed of the great majority of species of *Nicotiana* will germinate in darkness as well as in light. He finds that seeds of 5 varieties of *Nicotiana Tabacum*, representing a large proportion of the basic types from which the commercial strains of American tobaccos have been derived, and of 5 varieties of *N. rustica* will germinate readily in darkness. He found that in the majority of cases the number of both old and new seed germinated in darkness was as great as, or more than, that germinated in continuous light. He found also that seed may germinate in darkness slowly and scatteringly. He emphasizes the necessity of properly controlled experiments in connection with such work.—*W. A. Setchell.*

2909. Hurd, Annie May. **Some orienting effects of lights of equal intensities on Fucus spores and rhizoids.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 201–206. 1919.—Unilateral illumination of sufficient intensity orients the first cleavage plane in certain plant spores, the first cross wall being perpendicular to the direction of the light. To secure monochromatic

light seven Wratten filter screens were used; the wave lengths were determined, and a simple method for measuring and equalising intensities was devised. Fertilised eggs of *Fucus inflatus* were exposed to light of the seven wave lengths produced and also to white light. An electric arc gave light of all wave lengths, but the heating effect quickly killed the spores. Orientation of the first cell plate occurred in all isolated cells with light of short wave lengths produced by a mercury-vapor lamp. Both intensity and wave length seemed to be factors in the negative phototropism of young rhizoids. With spores germinating in close proximity to each other (within about 0.2 to 0.5 mm. or less), a group orientation occurred, the rhizoidal cell always being toward the center of the group. These orienting effects may be explainable by Child's theory of metabolic gradients.—*H. B. Frost.*

2910. RIDGWAY, CHARLES S. *A promising chemical photometer for plant physiological research.* Plant World 21: 234–240. 1918.—The author suggests a solution of 1 per cent uranium acetate and 5 per cent oxalic acid mixed in the proportion of 1: 4 as a chemical photometer for a study of light effects. Results of the tests were in general agreement with the Callendar pyrheliometer, although the two instruments involve different portions of the spectrum. The chief advantages are inexpensiveness, ease of taking readings, accuracy of determinations, and automatic integration.—*Chas. A. Shull.*

TOXIC AGENTS

2911. BINGER, C. A. L. *The selective inhibitory action of methylene blue and certain other common dyes on the growth of meningococci.* Jour. Infect. Diseases 25: 277–283. 1919.—Gentian violet, crystal violet, brilliant green, Bismarck brown, safranin, and methylene blue were found to have an inhibitory action upon the growth of meningococci. Basic fuchsin, vital red, fluorescin, and eosin did not inhibit the growth of these organisms. On comparing the inhibitory action of mercuric chloride, methylene blue, formaldehyde, and phenol, the first was found to exert the most powerful action, phenol the least, the other two compounds being intermediate. The growth of meningococci was inhibited by methylene blue at dilutions which failed to inhibit the growth of the other organisms with the exception of the gonococcus. The dilution at which methylene blue inhibited the growth of different suspensions of meningococci varied with the number of viable organisms present.—*Selman A. Waksman.*

2912. DAVIS, D. J. *The effect of potassium iodid on experimental sporotrichosis.* Jour. Infect. Diseases 25: 124–131. *2 fig.* 1919.—See Bot. Abstr. 3, Entry 1030.

2913. DEONG, E. R. *Effect of excessive sterilization measures on the germination of seeds.* Jour. Econ. Entomol. 12: 343–345. 1919.—This is a report of a study of the effect of temperature and of different amounts of cyanide, and of carbon bisulphide, all applied for various time intervals, upon the germination of seed *treated to stamp out insect infestation.* The seed used in the tests were as follows: wheat, 5 varieties; corn, 7 varieties; barley, 2 varieties; oats, 1 variety; rye, 1 variety; rice, 2 varieties; peanuts, 1 variety; alfalfa, 1 variety; peas, 2 varieties; beans, different genera and species; almonds, 14 varieties.—The effect of the treatments on the bean group is given in tabular form. Results indicate that beans are not so susceptible as usually supposed, if they are well cured. The common dosage in fumigation and "heat sterilization" are safe practices, both for grains and legumes, with proper precaution as to length of exposure and ventilation afterwards.—*A. B. Massey.*

2914. GREEN, H. H., AND N. H. KESTELL. *Behaviour of bacteria towards arsenic.* South African Jour. Sci. 15: 369–374. 1919.—Differences in tolerance of different bacteria for arsenic are very marked. Many which are fairly tolerant of arsenate are relatively sensitive to arsenite. Certain groups are characteristically sensitive, e.g., the *subtilis* group, of which the four leading representatives were tested, and all found intolerant of 0.05 per cent of As_2O_3 as sodium arsenite in broth. The *colon-typhoid* group is sensitive as a family, but has at least

one outstanding exception in *B. arsenreducens*, and other resistant members probably exist. Although over a dozen arsenic resistant species of bacteria were examined, only two showed any chemical activity towards arsenic; the earlier described *B. arsenoxydans*, which oxidizes arsenite to arsenate, and *B. arsenreducens*, which reduces arsenate to arsenite. The others were merely tolerant. In arsenical dipping tanks an automatic enriching of resistant faecal bacteria and suppression of sensitive forms takes place.—*E. M. Doidge.*

ELECTRICITY AND MECHANICAL AGENTS

2915. Lee, S. C. **Electrical treatment of seed.** Agric. Gaz. Canada 6: 173–175. 1919.

MISCELLANEOUS

2916. Haines, F. M. **A new auxanometer.** Ann. Botany 33: 181–188. 1919.—A fiber attached to the tip of the plant passes over a vertical support to a differential pulley wheel permitting magnification up to 100, and a connected fiber guides a pen carried on a horizontal trolley along a clock-driven drum. Thus far there is no great deviation in principle from some previous instruments, but a distinctive new feature is found in a device for compensating hygroscopic or other changes in length of the fibers used. It depends on the adjustment of three threads over balanced pulley wheels in such manner that the lengthening of any one is balanced by shortening of another, the details, somewhat complicated and involving use of weights, being not explainable without a diagram. The account is preliminary and not accompanied by test records, which will be awaited with interest in view of the many parts, including 8 pulleys and wheels, involved.—*W. F. Ganong.*

2917. Metge, G. [Rev. of: Wagner, P. **Wie wirkt die Saatgutbeschaffenheit auf den Kartoffelertrag unter dem Einfluss verschiedener Pflanzweite, Düngung und Jahreswitterung. (Influence of the seed stock on the yield of potatoes under the influence of different distances of planting, manuring and weather.)** Deutsch. Landw. Presse 45: 169, 175–176, 183. 1918.] Biedermann's Zentralbl. Agrikulturchem. 47: 325–333. 1918.—See Bot. Absts. 3, Entry 1386.

2918. Neger, F. W. **Die Blattrollkrankheit der Kartoffel.** [The leafroll disease of the potato.] Zeitschr. Pflanzenkrankh. 29: 27–48. *7 fig.* 1919.—See Bot. Absts. 3, Entry 2712.]

2919. Schoevers, T. A. C. **Het krullen van tomatenbladeren.** [The rolling of tomato leaves.] Tidschr. Plantenz. 25 (Bijblad): 11–12. 1919.—See Bot. Absts. 3, Entry 1659.

SOIL SCIENCE

J. J. Skinner, *Editor*

ACIDITY AND LIMING

2920. Anonymous. [Rev. of: Hoagland, D. R., and L. T. Sharp. **Relation of carbon dioxide to soil reaction as measured by the hydrogen electrode.** Jour. Agric. Res. 12: 139–148 1918.] Jour. Ecol. 7: 95. 1919.

2921. Anonymous. [Rev. of: Hutchinson, R. H. **Soil acidity as influenced by green manures.** Jour. Agric. Res. 13: 171–197.] Jour. Ecol. 7: 93–94. 1919.

2922. Hartwell, Burt L., F. R. Pember, and L. P. Howard. **Lime requirements as determined by the plant and by the chemist.** Soil Sci. 7: 279–282. 1919.—Determinations of the lime requirement of soil from limed and unlimed ammonium sulfate fertilized plots and limed and unlimed sodium nitrate fertilized plots showed all samples to have a considerable lime requirement. Pot experiments with beets and lettuce in the above soils treated with varying amounts of freshly hydrated calcium oxide showed that the maximum crop was obtained while the soil still showed a lime requirement of 5000 pounds as shown by analysis after crop growth.—*William J. Robbins.*

2923. LIPMAN, J. G. **Adjusting the soil reaction to the crop.** [Editorial.] Soil Sci. 7: 181. 1919.—Sulfur at the rate of 300–1000 pounds per acre is suggested as a means of producing an acid reaction in the soil suitable for growing scab-free potatoes on land which has been limed to allow the successful growing of lime-loving legumes.—*William J. Robbins.*

2924. MOOERS, C. A. **Abnormality of soils in field-placed cylinder experiments.** Soil Sci. 7: 247–251. 1919.—Five different soils placed in cylinders sunk in the ground and exposed otherwise to natural conditions were found to become unproductive to the extent of crop failure in from 3–8 years, except when limed. For none of the soils was the result observed under field conditions. The crop failure is due to acidity induced by excessive leaching. The cylinders prevent run-off which results in excessive leaching.—*William J. Robbins.*

2925. SHARP, L. T., AND D. R. HOAGLAND. **Notes on recent work concerning acid soils.** Soil Sci. 7: 197–200. 1919.—Heating acid soils with cane sugar solution produces marked inversion. Slightly acid or alkaline soils cause only slight inversion. The extracts of acid soils also produce marked inversion but less than the soils.—*William J. Robbins.*

2926. STEWART, ROBERT, AND F. A. WYATT. **Comparative value of various forms of limestone.** Soil Sci. 7: 273–278. 1919.—For application to acid land dolomitic limestone is as effective if not more so than the high-calcium limestone. In a 4-year experiment finely ground limestone was not more effective than was the total product from a ¼ inch screen. The annual loss of limestone from the surface 20 inches of two fields was 700 and 542 pounds per acre respectively.—*William J. Robbins.*

ALKALI SALTS

2927. GOKHALE, V. G. **A study of the conditions under which water of tidal saline creeks is utilized for crop production in Kankan.** Agric. Jour. India 14: 422–430. 1919.—*Solanum melongena* and *Capsicum frutescens* were found to grow under conditions of alkalinity caused by using saline irrigation water where other crops failed. The creek waters of the Kankan district vary in salt content during the year. Water from the creeks of the Amber River was found to be suitable for irrigation use until December, but after this time the salt content was too high for agricultural purposes.—*J. J. Skinner.*

2928. KRISHNAMURTI ROW, K. **The effect of salinity on the growth and composition of sugar cane varieties.** Agric. Jour. India 14: 476–493. *11 pl., 5 charts.* 1919.—As a result of experiments during 1914–18 it was found that thick juicy varieties do not grow well in alkaline soils. Karum, Chitton, Kaludai, Boothan, Poovan, B. 208, Purple Mauritius, Magh, Bogapura, J. 36, and D. 74, are varieties which failed in an alkaline soil. Cheni, Naanal, Kstha, Saretha, Putli Khajee, Hullu Kahbu, M. 1017, Jagannathia, Dhar, M. 1826, M. 19, and M. 2104 succeeded fairly well. The soil in which the cane grew contained 0.17 per cent total soluble salts, 0.061 per cent was sodium chloride. The checking of growth is traced primarily to the sodium chloride. The effect of growing cane under saline conditions is to give an impure juice containing large amounts of chlorine and potash. It was found that the chlorine content of cane sugar depends on the nature of the variety and the condition of soil and water under which it is grown. The effect of large quantities of chlorine in dry juice is to lower the sucrose, purity and glucose content of that juice. The amount and purity of juice produced by different varieties grown on two soils is given.—*J. J. Skinner.*

2929. SWADI, T. S. **A preliminary note on some new factors affecting the hardness of gur or crude sugar.** Agric. Jour. India 14: 431–439. 1919.—Tabular data are given which show the relation between the soil on which sugar cane grew, character of manure used, water used in irrigation, and character of sugar produced. Grey soil and braskish water produce cane yielding a soft and fluid gur. The quality of gur is influenced by character of soil, in which the cane grew.—*J. J. Skinner.*

INFLUENCE OF BIOLOGICAL AGENTS

2930. Ames, J. W., and G. E. Boltz. **Effect of sulfofication and nitrification on potassium and other soil constituents.** Soil Sci. 7: 183–195. 1919.—The nitrification of dried blood and oxidation of sulfur in the soil increased the water soluble potash, calcium, aluminum and manganese. Magnesium was less easily attacked than calcium. Ammonium sulfate had a solvent effect on calcium and potash.—*William J. Robbins.*

2931. Anonymous. [Rev. of: Gainey, P. L. **Effect of paraffin on the accumulation of ammonia and nitrates in the soil.** Jour. Agric. Res. 10: 355–364. 1918.] Jour. Ecol., 7: 97. 1919.

2932. Anonymous. [Rev. of: Hills, T. L. **Influence of nitrates on nitrogen-assimilating bacteria.** Jour. Agric. Res. 12: 183–230. 1918.] Jour. Ecol. 7: 96. 1919.

2933. Anonymous. [Rev. of: Millar, C. E. **Relation between biological activities in the presence of various salts and the concentration of the soil solution in different classes of soil.** Jour. Agric. Res. 13: 213–223. 1918.] Jour. Ecol. 7: 94. 1919.—The author reports the data obtained from experiments conducted to show the effect of various salts upon the bacterial flora of soils. They tend to prove that the effect of the salts was much modified by the nature of the soils to which they were added. It seemed improbable that the osmotic pressure of the soil solution was the governing factor in determining the nature or abundance of the soil flora.—*Geo. D. Fuller.*

2934. Fellers, C. R. **Longevity of B. radicicola on legume seeds.** Soil Sci. 7: 217–232. 1919.—Dry sterile soy bean and alfalfa seeds were inoculated with *B. radicicola* in nodule infusions, in soil or commercial cultures. After varying periods of storage in dry condition the number of *B. radicicola* per seed was determined by plating methods and nodule formation was determined in soil cultures in the green house. Soy bean or alfalfa seed inoculated with a nodule infusion retain viable organisms on the seed coats for 6–9 months. Infected soil or commercial cultures gave as good results as the nodule infusion. Five minutes contact with the inoculant gave as good results as longer periods of contact. It is not recommended that inoculated seeds be stored for long periods before planting but a delay of several days or even a month should do no great harm.—*William J. Robbins.*

2935. Gainey, P. L. **Parallel formation of carbon-dioxide, ammonia and nitrate in soil.** Soil Sci. 7: 293–311. 1919.—The carbon-dioxide, ammonia and nitrates were determined in soils in cylinders through which a current of air was drawn. The carbon-dioxide and ammonia production under conditions favorable for bacterial activity when cottonseed meal was added to the soil reached a maximum in the second 24 hours. In the case of dried blood the maximum is reached between the 6th and 8th days. Insufficient moisture retards both carbon-dioxide and ammonia production, the latter more markedly. Insufficient aeration retards the carbon-dioxide and ammonia production. Accumulation of nitrate was directly proportional to moisture content. Insufficient aeration retarded the initial accumulation of nitrate but after nitrification became active the accumulation was inversely proportional to aeration.—*William J. Robbins.*

2936. Haas, A. R. C., and E. B. Fred. **Effect of soybean germination upon the growth of its nodule-forming bacteria.** Soil Sci. 7: 237–245. *1 pl., 2 fig.* 1919.—When mercuric chloride is used to sterilize soybeans sufficient mercuric chloride is retained by the seed to retard the development of its nodule bacteria in agar plates in the vicinity of the seed. Germination of bacteria-free soybeans secured directly from the pods excrete no substance toxic to the growth of the nodule bacteria but favor this growth. Nineteen varieties of soybeans tested showed no difference in susceptibility to inoculation.—*William J. Robbins.*

2937. JOSHI, N. V. **Rate of nitrification of different green manures and parts of green manures and the influence of crop residues on nitrification.** Agric. Jour. India 14: 395–413. 1919.—The paper discusses; what happens to green manure when incorporated in the soil for the coming winter crop, decomposition of different kinds of green manures, decomposition of different parts of green manure—leaves, stems, roots, effect of the undecomposed tissues or crop residues on the process of nitrification. Three woody plants, sann-hemp (*Crotalaria juncea*), dhaincha (*Sesbania aculeata*) and tamarind (*Tamarindus indica*) and three succulent plants, guvar (*Cyamopsis psoralioides*), cow-pea (*Vigna catjang*) and gukarn (*Clitoria ternatea*) were chosen for the purpose of the experiment. Green whole plants of the above were cut up and used in pot cultures to determine the rate of nitrate accumulation in the soil. Tamarind plants gave negative results for nitrification, yet decomposition and ammonification had taken place. Rate of nitrification of the succulent plants was in an inverse ratio to the succulence of the stems the more tender and easily decomposed the tissues, the slower the nitrification. Because of the greater amount of oxidizable carbonaceous material in the succulent tissues, a smaller amount of nitrogenous material is changed into the ammoniacal condition and consequently less nitrification in the succulent plants than in the woody ones in the early stages of decomposition, or putrefactive bacteria attacking the succulent tissues multiply so rapidly that they form bacteria-toxins and other deleterious substances the presence of which may retard the nitrification. Two other alternatives are offered. True denitrification may set in simultaneously with nitrification, due to the great amount of succulent green manures, or further, putrefactive bacteria may assimilate the nitrates formed, for their own growth. In sann-hemp, dhaincha, guvar and cow-peas over 75 per cent of the nitrogen of the plant is contained in the leaves and the stems. During the first two months after burial of the green manures, accumulation of nitrates is due to the leaves of the plants and not to stems or roots. It is highly probable that the stems and roots serve as a source of energy for nitrogen fixing bacteria, as Azotobacter, and so ultimately prove an indirect source of nitrogen.—*F. M. Schertz.*

2938. PLYMEN, F. J., AND D. V. BOL. **The biological determination of the relative availability of different nitrogenous organic manures in black cotton soil.** Agric. Jour. India 14: 414–421. 1919.—The relative availability of the common oil cakes used as manures was determined by studying the rate at which the nitrogen they contain undergoes bacterial transformation. In the black cotton soil of Deccan, koranja (*Pongamia glabra*), and cotton cakes are the most quickly available, with castor cake (*Ricinus communis*) a close third. Mahua cake (*Bassia latifolia*) and sorson cake (*Brassica napus*) are the slowest to nitrify.—*J. J. Skinner.*

CROP FERTILIZATION

2939. PRIZER, J. A. **Fertilization of citrus groves during period of high priced fertilizers.** California Citrograph 4: 231, 255. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2359.

FERTILIZER RESOURCES

2940. BURD, J. S. **Peat as a manure substitute.** Jour. Amer. Peat Soc. 12: 53–62. 1919.—The plant food constituents of peat do not have the same value as those of high grade fertilizers. Peat is not commercially or agriculturally as valuable as farm yard manure. The inoculation of peat is regarded as a useless procedure.—*George B. Rigg.*

2941. HOFF, J. N. **Peat fertilizer.** Jour. Amer. Peat Soc. 12: 6. 1919.—U. S. Patent 1,261,025, April 2, 1918, covers a method of preparing fertiliser from peat, by treatment with phosphates and subsequent inoculation with bacteria.—*George B. Rigg.*

2942. SMIT, B. T. **Bat Guano.** Union South Africa Bull. 15: 1918. The following table shows the percentages of the various constituents in soils, which are compared with two analyses of bat guano.

	Average of 100 typical Transvaal soils	Bat guano 2151	Bat guano 1472
Organic matter	5.84	4.13	72.00
Moisture	2.40	1.51	
Lime	0.24	....	1.38
Potash	0.19	0.03	1.73
Phosphoric acid	0.05	0.02	6.01
Nitrogen	0.114	0.06	9.63

It is seen that bat guano number 2151 has a composition far below the average composition of the soils in plant food constituents, while No. 1472 is far above that of the average soil. In analyzing the bat guanos the author found the maximum amount of P_2O_5 to be 17.47 per cent, for K_2O 11.45 per cent, for N 9.63 per cent, and a minimum for P_2O_5 of 0.02 per cent, K_2O trace and nitrogen 0.06 per cent. The average composition of fresh bat guano was found to contain P_2O_5 5.67 per cent, K_2O 1.37 per cent, and N 5.65 per cent. Of 103 samples of bat guano the author classed 28 as nitrogenous, 33 as phosphatic, 8 as balanced, and 34 as worthless.—*F. M. Schertz.*

FERTILITY STUDIES

2943. Anonymous. [Rev. of: Hoagland, D. R. **The freezing point method as an index of variations in the soil solution due to season and crop growth.** Jour. Agric. Res. 12: 369–395. 1918.] Jour. Ecol. 7: 95. 1919.

2944. Anonymous. [Rev. of: Howard, A. **Recent investigations on soil aeration, Part I, with special reference to agriculture.** Indian Forester 1918: 187–202. 1918.] Jour. Ecol. 7: 89–91. 1919.—The author presents data upon the decrease of oxygen and the increase of carbon-dioxide in the soil atmosphere after heavy manuring or when there is a surface accumulation of water. In irrigated soils in Northern India the crops often show symptoms of poor soil aeration leading to a decrease in yield.—*Geo. D. Fuller.*

2945. Jennings, David S. **Effect of certain colloidal substances on the growth of wheat seedlings.** Soil Sci. 7: 201–215. 1919.—Agar added to nutrient solutions increases the growth of wheat seedlings in low concentrations but decreases the growth in higher concentrations of nutrient solutions. The introduction of colloidal silicon into nutrient solutions results in increased weight of wheat seedlings due to the direct absorption of the silicon by the plant. The introduction of quartz, ferric hydroxide, and aluminum hydroxide into nutrient solutions results in decreased growth of wheat seedlings due to the fact that their absorptive power reduces the effective concentration of the nutrient solution.—*William J. Robbins.*

2946. Lyon, T. L. **Experiments in fertilizing a crop rotation.** New York Agric. Exp. Sta. [Cornell] Bull. 399: 19–30. Feb., 1919.—In a rotation consisting of 3 years in hay, followed by maize, oats and wheat, more profitable results were obtained when the fertilizer was applied each year to the timothy than when it was applied to the other crops.—*W. O. Glover.*

2947. McMiller, Paul R. **Some notes on the cause of the unproductivity of "raw soils" in humid regions.** Soil Sci. 7: 233–236. 1919.—Some Minnesota subsoils are as productive toward alfalfa when inoculated as are the corresponding surface soils, while others are much less productive. The application of soluble potash and phosphoric acid fertilizers renders these subsoils as productive as the corresponding surface soils.—*William J. Robbins.*

2948. Millar, C. E. **Comparative rate of formation of soluble material in cropped and virgin soils as measured by the freezing-point method.** Soil Sci. 7: 253–257. 1919.—Virgin and cropped samples of 6 soils were washed with distilled water until practically all of the soluble material was removed as indicated by the freezing point method. The moist soils were then incubated at 25°C. and the amount of soluble material which formed determined

by the freezing-point method. Where the cropped soils had given evidence of decreased productivity the rate of formation of soluble material was higher in the virgin than in the cropped soil samples.—*William J. Robbins.*

SOIL CLASSIFICATION

2949. PENDLETON, R. L. **Are soils mapped under a given type name by the Bureau of Soils method closely similar to one another?** Univ. of California Publ. Agric. Sci. 3: 369-426. *Pl. 43-74. 33 text fig.* 1919.—An inquiry into the physical, chemical, and biological characters of samples of certain soils supposed to belong to the same types. The principal studies were made upon Hanford fine sandy loam and San Joaquin sandy loam. Random samples were not procured, instead, bulk samples were taken from one locality in each area.—The mechanical analyses and moisture equivalent values for the several types showed differences of sufficient magnitude to justify the field separation, but the hygroscopic coefficients were not so distinctly correlated with soil types.—The nitrogen, phosphorus, and calcium content of the types was quite distinct; while the magnesium and potassium content was not well marked.—The ammonifying power of the samples was more closely correlated with type than the nitrogen fixing or nitrifying powers.—Samples of soil used for cultures under glass gave varying results. While different representatives of a given type did not give similar yields of plants, yet "the types are distinct with respect to their fertility, considering their average production."—"It is pointed out that despite its defects, the work of the Bureau of Soils is of value, and is practically the only type of soil classification and mapping possible under the conditions imposed."—A prefatory note by C. B. LIPMAN gives certain criticisms on the methods and validity of soil classification.—*H. S. Reed.*

MOISTURE RELATIONS

2950. ANONYMOUS. [Rev. of: ALWAY, F. A., AND G. R. MCDOLE. **Relation of movement of water in a soil to its hygroscopicity and initial moistness.** Jour. Agric. Res. 10: 391-428. 1917.] Jour. Ecol. 7: 98. 1919.—The authors conducted experiments on the capillary rise of water and the downward penetration of various amounts of water having their initial moisture always above the hygroscopic coefficient. The relative rates and heights of rise in different soils are not similar to the relative rates and distances of penetration, nor was there a definite dependence of the rise upon hygroscopicity. An abundance of data upon these and similar phenomena of water movement are presented.—*Geo. D. Fuller.*

2951. ANONYMOUS. [Rev. of: STEWART, GUY R. **Effect of season and crop growth in modifying the soil extract.** Jour. Agric. Res. 12: 311-368. 1918.] Jour. Ecol. 7: 93. 1919.—The author, in presenting a historical review of the subject, draws attention to the contradictory nature of many of the results. Experimental data extending over 2 years with 13 soils, cropped and uncropped, showed not only striking differences between the soluble nutrients of the different soils but also notable differences between the nitrates, calcium, potassium and magnesium in the cropped and uncropped soils of the same sort. Phosphates did not exhibit corresponding differences. In general the investigations show that large amounts of water-soluble nutrients are developed by cultivation, fallowing and biennial cropping.—*Geo. D. Fuller.*

2952. HOWARD, ALBERT, AND G. C. HOWARD. **Drainage and crop production in India.** Agric. Jour. India 14: 377-387. *2 pl., 2 fig.* 1919.—A general discussion of drainage and effect on soil fertility in India. Illustrations show the effect of soil aeration on root development.—*J. J. Skinner.*

2953. HIBBARD, P. L. **Changes in composition of the soil and of the water extract of the soil, following addition of manure.** Soil Sci. 7: 259-272. 1919.—Fresh manure when mixed with soil increases the carbon dioxide in the soil, decreases the total carbon, does not affect the total nitrogen, first decreases and then increases the total water-soluble material.—*William J. Robbins.*

MISCELLANEOUS

2954. Cook, O. F. **Experiments in spacing cotton.** Jour. Amer. Soc. Agron. 2: 299–303. 1919.—See Bot. Absts. 3, Entry 1862.

2955. Kiesselbach, T. A. **Plat competition as a source of error in crop tests.** Jour. Amer. Soc. Agron. 2: 242–247. 1919.—The investigations were conducted for the purpose of determining the extent to which plat competition is a factor in crop yield tests.—*F. M. Scherts.*

2956. Moreno, Eduardo. **La combustibilidad del tabaco. Contribucion al estudio agro-quemico de la hoja.** [Combustibility of tobacco.] Revist. Agric. Com. y Trab. 2: 377–379. 1919.—See Bot. Absts. 3, Entry 1879.

2957. Sewell, M. C. **Tillage: a review of the literature.** Jour. Amer. Soc. Agron. 2: 269–290. 1919.—See Bot. Absts. 3, Entry 1883.

2958. Severance, George. **Twenty-eighth annual report for the year ending June 30, 1918.** Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—See Bot. Absts. 3, Entry 1882.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

2959. Anonymous. [Rev. of: Britton, Nathaniel Lord. Flora of Bermuda (Illustrated). *xi+585 p.* Charles Scribners Sons: New York, 1918.] Jour. Botany 57: 44–46. 1919.

2960. Anonymous. [Rev. of: Ewart, Alfred J., and Olive B. Davies, with appendices by J. H. Maiden, and by A. A. Hamilton, and Edwin Cheel. **The flora of the Northern Territory.** *viii+287 p., 24 pl.* McCarron, Bird and Co.: Melbourne, 1917.] Jour. Botany 57: 69–71. 1919.—The title is said to be in some respects a misnomer because of the range included. Access to types would have avoided many mistakes into which the authors have fallen. New species and genera are included; some names in opposition to the Vienna Laws. In its general get-up the book is very unsatisfactory. Poor arrangement and typography are criticised. "There is no need to pursue a criticism which might be indefinitely extended, and which is undertaken in the hope that it may influence future publications from the same source."—*K. M. Wiegand.*

2961. Anonymous. [Rev. of: Frederick Lewis' paper before the Linnaean Society on "Notes on a visit to Kunadiyaparawitta Mountain."] Jour. Botany 57: 134–135. 1919.—*K. M. Wiegand.*

2962. Anonymous. [Brief rev. of: **Flora of tropical Africa,** Vol. 1X, part 2, "1918," continuing Dr. Stapf's monograph of the Andropogoneae.] Jour. Botany 57: 72. 1919.

2963. Ashe, W. W. **Notes on trees and shrubs in the vicinity of Washington.** Bull. Torrey Bot. Club 46: 221–226. 1919.—Some trees and shrubs are reported which have not previously been recorded from the vicinity of Washington, D. C. The following are described: *Amelanchier canadensis intermedia* (Spach) comb. nov., *Amelanchier sera* sp. nov., *Amelanchier micropetala* (Robinson) sp. nov. *Amelanchier micropetala potomacensis* var. nov., *Carya glabra hirsuta* (Ashe) comb. nov.—*P. A. Munz.*

2964. Baker, Edmund G. **The African species of Allophylus.** Jour. Botany 57: 181–190. 1919 (concluded from *Ibid.* 57: 160).—Notes are given on forty-five species. In addition the following species are described as new: *A. toroensis*, Uganda; *A. gazensis*, Gaza-land; *A. cuneatus*, Limoru; *A. cazengoensis*, Cazengo; *A. andongensis*, Angola; *A. Talbottii*, Nigeria;

A. Gossweileri, Angola; *A. Usheri*, Uganda; *A. Dummeri*, Uganda; *A. crebriflorus*, Uganda; *A. Kassneri*, Congo; *A. brachycalyx*, Uganda; *A. Holubii*, Zambesi; and *A. cataractarum*, Rhodesia. The following varieties are described as new: *A. Buchanani* Gilg var. *ugandensis*, and *A. congolanus* Gilg. var. *monophyllus*. *Schmidelia thyrsoides* Baker = *Aphania senegalensis* Radlk.—*K. M. Wiegand.*

2965. BALDACCI, A., AND A. BÉGUINOT. Contributo alla flora autumnale ed invernale dei dintorni di Vallona. [Autumn and winter flora of Vallona.] Nuovo Giorn. Bot. Ital. 25: 70–88. 1918.

2966. BENNETT, ARTHUR. Cheshire Plants. Jour. Botany 57: 129–130. 1919.—Notes on R. S. ADAMSON'a paper on the Flora nf Nnrthern Cheshire (Jour. Botany 57: 91).—*Ceterach officinarum* and *Potamogeton praelongus* are cited as the only new records for the county. Additional stations are noted for other species in Adamson's list. A few other records are added in the genera, *Elatine*, *Callitriche*, *Saxifraga*, *Arctostaphylos*, *Euphorbia*, *Carex* and *Lycopodium*. The Naturalist for 1899, p. 353; for 1904, p. 23; and SPENCER MOORE'S notes in Jour. Botany for 1900, p. 74, are referred to for additional records.—*K. M. Wiegand.*

2967. BOLZON, P. Aggiunte alla flora dell 'Appennino Ligure-Emiliano. [Appendix to flora of Appenine Ligure-Emiliani.] Bull. Soc. Bot. Ital. 1918: 55–61. 1918.

2968. BOWLES, CHAS. W. Systematic botany. Amer. Bot. 25: 57–63. *1 pl.* 1919.—An outline of the vegetable kingdom is given, with directions for distinguishing the major groups of plants. The illustrated Key makes these groups more easily comprehended.—*W. N. Clute.*

2969. BRITTEN, JAMES. Bibliographical Notes, LXXV. Madeira flowers. Jour. Botany 57: 97–99. 1919.—A review of: (1) MRS. PENFOLD'S "Madeira flowers, fruits and ferns." Reeve Bros., 1845. (2) MRS. AUGUSTA J. ROBLEY'S "Selection of Madeira Flowers." Reeve Bros., 1845.—*K. M. Wiegand.*

2970. BURNHAM, STEWART H. The sedges of the Lake George flora. Torreya 19: 125–136. 1919.—The region covered includes the New York counties of Washington, Warren and Saratoga, with a few additional records from Essex County. Brief notes on habitat, station and frequency of each species are appended. The total of forms enumerated is as follows: *Cyperus*, 8 species; *Eleocharis*, 8 sp., 2 varieties; *Stenophyllus*, 1 sp.; *Fimbristylis*, 1 sp.; *Eriophorum*, 5 sp., 1 var.; *Scirpus*, 17 sp., 1 var., 1 forma; *Dulichium*, 1 sp.; *Rynchospora*, 4 sp.; *Mariscus*, 1 sp.; *Carex*, 94 sp., 25 var., 1 forms, 2 hybrids.—One new variety is published, *Carex complanata* Torr. var. *robusta*, discovered June 18, 1892, 1 mile north of Kingsbury Street. Four new combinations are made: *Carex Leersii* Willd. var. *angustata* (Carey); *C. Leersii* var. *cephalantha* (Bailey); *C. normalis* Mackenzie var. *perlonga* (Fernald); *C. blanda* Dewey var. *varians* (Bailey).—*J. C. Nelson.*

2971. CHIOVENDA, E. Intorno alla priorità dei nomi generici Polystichum e Aspidium. [On the priority of the generic names Polystichum and Aspidium.] Bull. Soc. Bot. Ital. 1918: 28–32. 1918.

2972. CORREVON, H. Icones florae alpinae plantarum. [Illustrations of plants of the alpine flora.] II[3]. *29 p., 17 pl., 25 fig., 14 distribution maps.* [No date; copy received June 2, 1919.]—This fascicle describes briefly, gives rather detailed distribution, and illustrates by numerous figures and heliotype plates *Cerastium latifolium* L., *C. pedunculatum* Gaud., *C. uniflorum* Murith, *Saxifraga biflora* All., *S. macropetala* Kerner, *S. oppositifolia* L., *S. geranioides* L., *Senecio Carniolicus* W., *Achillea Barrelieri* Sz., *A. tenuifolia* Schur., and *Artemisia Mutellina* Vill. [In French.] Notes on culture are given, to which R. FARRER has also contributed in English. [See also next following Entry, 2973.]—*O. E. Jennings.*

2973. Correvon, H. **Icones florae alpinae plantarum.** [Illustrations of plants of the alpine flora.] II[10]. *56 p., 16 pl., 85 fig., 15 distribution maps.* [No date; copy received June 2, 1919.]—Brief description, notes on culture, detailed notes on distribution with numerous drawings and plates of the following: alpine plants: *Saxifraga Aizoon* Jacq., *S. firmata* Luiset, *S. pubescens* Pourret, *S. cernua* L., *S. rivularis* L., *Valeriana globulariifolia* Ram., *V. supina* L., *Achillea atrata* L., *A. Herbarota* All., *A. moschata* Jacq., and *A. nana* O. Under *Achillea atrata* L., are published, evidently as new, races *genuina*, *Clusiana*, and *multifida*. —*O. E. Jennings.*

2974. Cremata, Merlino. **Una planta rara en la finca "el Chico."** [A rare plant on the "El Chico" estate.] Revist. Agric. Com. y Trab. [Habana] 2: 155–156. 1919.—The name of a plant as determined by various persons is given as *Coccoloba grandifolia* Jacq., in reply to a request in a previous number of this Revista (1: 630).—*F. M. Blodgett.*

2975. DeCandolle, Cas. **Beiträge zur Kenntnis der Piperaceen von Papuasien.** [Contribution to the knowledge of the Piperaceae of Papuasia.] Bot. Jahrb. 55: 204–220. 1918.—*I. Piperacsae Schlechterianae.* Thirteen species of *Piper*, collected by Schlechter in New Guinea, are listed, of which five are described as new, as follows: *P. Schlechteri*, *P. nudipedunculum*, *P. subnudilimbum*, *P. pseudamboinense*, and *P. hirtovarium*. In *Peperomia* five species are listed, of which *P. bismarckiana*, *P. microstachya*, and *P. lasiorhachis* are described as new.—II. *Piperaceae novae imprimis Ledermannianae.* A study based on plants collected by Ledermann in New Guinea. Nineteen species and one variety of *Piper* are listed, of which the following seventeen are described as new: *P. breviantherum*, *P. internovarium*, *P. albopunctatum*, *P. rupicola*, *P. macrostylum*, *P. gibbilimbum*, *P. noveninervium*, *P. nigrovirens*, *P. dumiformans*, *P. brevipes*, *P. albamentum*, *P. chlorostachyum*, *P. cinerescaule*, *P. subvirosum*, *P. longifilamentum*, *P. longipilum*, *P. fuscescentispicum*, and *P. Ledermannii*. In *Peperomia* eight species are listed all of which are described as new, as follows: *P. angustilimba*, *P. pubilimba*, *P. linearifolia*, *P. bryophila*, *P. Bamleri*, *P. Ledermannii*, *P. rubrimaculata*, and *P. udinilocstris*.—*K. M. Wiegand.*

2976. Dunbar, John. **Forty-two distinct forms of hickories.** [Rev. of: Sargent, C. S. Notes on North American trees—II. Carya. Bot. Gaz. 66: 229–258. 1918.] Amer. Nut Jour. 10: 20–21. *1 fig.* 1919.

2977. Fiori, Adr. **Piante da aggiungersi alla flora del Bosco Cansiglio e del m. Cavallo nel Trevigiano.** [Additions to flora of Bosco Cansiglio, etc.] Bull. Soc. Bot. Ital. 1918: 35–41. 1918.

2978. Gilg, Ernst. **Die bis jetzt aus Neu-Guinea bekannt gewordenen Flacourtiaceen.** [The known Flacourtiaceae of New Guinea.] Bot. Jahrb. 55: 273–294. *9 fig.* 1918.—Few species of the Flacourtiaceae have been previously known from New Guinea, and these were mostly described in recent years. The family plays an insignificant rôle in the vegetation formations. It is of interest that with the exception of *Casearia* none of the larger genera of this family are represented here by many species. All the genera belong to the indo-malaysian floral region. No keys are given. Critical notes on structure distribution and synonomy are presented. The following genera are treated, with the appended number of species in each: *Erythrospermum*, 1sp., *Hydnocarpus*, 1sp., *Scolopia*, 1sp., *Homalium*, 3sp., *Xylosma*, 1sp., *Flacourtia*, 3sp., *Doryalis*, 1sp., *Bennettia*, 1sp., *Osmelia*, 1sp., *Casearia*, 9 sp. The following species are described as new: *Homalium amplifolium*, *H. pachyphyllum*, *H. acutissimum*, *Xylosma papuanum*, *Doryalis macrodendron*, *Bennettia papuana*, *Casearia Ledermannii*, *C. urophylla*, *C. pachyphylla*, *C. anisophylla*, *C. globifera*, *C. macrantha*, and *C. brunneo-striata*. *Homalium Gilgianum* Laut. is shown to be in reality *Lophopyxis pentaptera* (K. Sch.) Engl. It belongs neither to the genus *Homalium* of the Flacourtiaceae nor to the Rhamnaceae which it very much resembles, but to the Icacinaceae. The position of the genus *Gertrudia* K. Schum. is discussed, and it is shown not to belong to the Flacourtiaceae.

Neither does it belong to the Euphorbiaceae with which it has much in common. Until more and better material is forthcoming, it must remain unassigned to any family.—*K. M. Wiegand.*

2979. GILG, ERNST, AND RUDOLF SCHLECHTER. **Ueber zwei pflanzengeographisch interessante Monimiaceen aus Deutsch-Neu-Guinea.** [On two geographically interesting Monimiaceae from German New Guinea.] Bot. Jahrb. 55: 195–201. *2 fig.* 1918.—Through the rich Ledermann material, it has been possible to show that the genera *Trimenia*, *Piptocalyx*, and *Xymalos* are true Monimiaceae, a fact about which Bentham and Hooker and also Perkins and Gilg were in doubt. It is shown, through statistics from the various genera of the Monimiaceae, that there is here good evidence in support of the contention that the flora of the Polynesian Islands, with the exception of Hawaii, and that of northern Australia are extensions of the very characteristic Papuan flora. They are in fact a relic of that flora. *Trimenia* and *Piptocalyx* are especially discussed. *T. papuana* Ridl. is redescribed, and *P. macrurus* is described as new. Previously there was but one species known in each genus.—*K. M. Wiegand.*

2980. GODFREY, M. J. "Epipactis media (Fries!)" Bah. Jour. Botany 57: 80–83. 1919. —A discussion of the *E. media* of BARINGTON, and the subsequent incorrect application of this name in English botany. The confusion of *E. viridiflora*, *atrorubens* and *latifolia* is discussed. Material from the original locality of *E. media* was studied, and the conclusion reached that it was *E. viridiflora* Reich. Its first record as a British plant was by LEIGHTON in 1835. "The subsequent application of the name *E. media* to specimens of *E. latifolia* with rugose bosses appears to have been founded on a misapprehension, and the term *E. media* should now disappear from British botany, except as a synonym of *E. atrorubens*" with which it was confused.—*K. M. Wiegand.*

2981. HENRARD, J. TH. **Galeopsis, een systematisch-floristische studie.** [Galeopsis, a systematic and floristic study.] Nederland, Kruidkundig Arch. 1918: 158–188. May, 1919.—To be continued.—Monograph of the species and the varieties of the genus with keys, descriptions, and critical notes. Nine new varietal names and new subspecies and subvarieties are referred to.—*J. A. Nieuwland.*

2982. HENRIKSSON, J. **Om Corylus Avellana.** Supplementum I. (Swedish, with Latin diagnosis.) Bot. Notiser 1918: 207–209. *3 fig.* 1918.—Six new varieties are described.—*P. A. Rydberg.*

2983. HOLE, R. S. **A new species of Ixora.** Indian Forester 45: 15–16. 1919.—*Ixora Butterwickii*, allied to *I. spectabilis* Wall. and *I. pendula* Jack, is described from the Palws Reserve in the Yamethin district of Burma. A fuller description with illustrations is shortly to be published in the Indian Forest Records.—*J. R. Schramm.*

2984. HOLE, R. S. **Interpretation of botanical terms.** Indian Forester 45: 27–28. 1919.

2985. HOLMBERG, OTTO R. **Carex diandra × paniculata, en for Scandinavien ny hybrid.** [Carex diandra × paniculata, a new hybrid for Scandinavia.] [Swedish.] Bot. Notiser 1918: 249–252. *1 fig.* 1918.—The specimens were found at Lomma, province of Skåne, Sweden. As these specimens differed somewhat from the original ones from Germany, the author compares them with the parents, which were not typical forms of said species, but f. *tenella* of the former and f. *simplex* of the latter.—*P. A. Rydberg.*

2986. HOUSE, HOMER D. **A small collection of plants from central New York, collected by Dr. Asa Gray, 1832.** (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 10–13. 1918.—A list of 127 species collected in May, 1832, at Utica, Little Falls, and Paris, New York, together with a letter giving historical data.—*Alfred H. W. Povah.*

2987. House, Homer D. **Notes on local floras, V.** (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 14–31. *2 fig.* 1918.—Notes on range of 50 species in New York State are given with an outline map of the state showing the distribution of three species of *Ophrys*.—*Alfred H. W. Povah.*

2988. *House*, Homer D. **Two plants new to the flora of the United States.** (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 31. 1918.—*Geryonia ciliata* (Haw) House *comb. nov.*, a native of India, was found on dredgings at Ferndale, Oregon, and *Geranium pyrenaicum* Burm. f., a native of Europe, was found on a mussel reef at Cape Arago, Oregon, by Dr. W. Haydon. Specimens of the former have been deposited in the Gray Herbarium.—*Alfred H. W. Povah.*

2989. Jansen, P., and W. H. Wachter. **Floristische aanteekeningen. XV.** [Floristic Notes.] Nederland. Kruidkundig Arch. 1918: 90–110. May, 1919.—Keys and descriptions of adventive plants to Holland, also varieties and hybrids. These are described strikingly in balanced columns thus aptly emphasizing distinctive characters.—*J. A. Nieuwland.*

2990. Kloos, Jr., A. W. **Verslag van de Pinkster excursie in the omgeving van Weert.** [Report of the Pentecost excursion in the neighborhood of Weert, Holland.] Nederland. Kruidkundig Arch. 1918: 73–89. May, 1919.—The plants that were found on the expedition, many adventive and new to the locality, are reported with remarks as to origin, character, and abundance.—*J. A. Nieuwland.*

2991. Lacaita, C. **Piante Italiane critiche o rare.** [Critical or rare plants of Italy.] Nuovo Giorn. Bot. Ital. 25: 1–63. *6 pl.* 1918.—The author presents detailed notes on several critical or rare plants of Italy and includes descriptions of the following new species and varieties: *Campanula pseudostenocodon*, *Convolvulus elegantissimus* Mill. var. *argyreus*, *Hieracium strictiflorum*, *Lavatera thuringiaca* var. *silvestris* (L. *sylvestris* Cir.), and *Saxifraga bulbifera* L. var. *pseudogranulata*. [See also next following Entry, 2992.]—*J. M. Greenman.*

2992. Lacaita, C. **Piante Italiane critiche o rare.** [Rare or critical Italian plants.] Nuovo Gior. Bot. Ital. 25: 97–145. 1918.—In this paper, which is one of a continued series, the writer describes and goes into critical discussion of Italian plants which are rare or difficult. The genera considered are: *Carlina*, *Centaurea*, *Cirsium*, *Echium*, *Lamium*. *Cirsium Grandii* is described as a new hybrid species; *C. creticum* var. *Triumfetti* appears as a new variety; *C. spurium* (DC.) and *Carlina acaulis* var. *ramosa* are published as new combinations; and *Centaurea collina* var. *Gouani*, *Cirsium Triumfetti*, and *C. stabianum* are given as new names. [See also next preceding Entry, 2991.]—*Ernst Artschwager.*

2993. Lauterbach, G. **Beiträge zur flora von Papuasien. VI.** [Contributions to the flora of Papuasia. VI.] Bot. Jahrb. 55: 145–312. Dec. 13, 1918.—The present contribution is a continuation from a previous number of Engler's Botanische Jahrbucher (55: 136. 1917) of the authors results of researches on the flora of New Guinea in coöperation with C. De Candolle, E. Gilg, R. Schlechter, and O. E. Schultz. The scope and character of the contribution are indicated under the names of the coöperating specialists.—*J. M. Greenman.*

2994. Lauterbach, G. **Die Rutaceen Papuasiens.** [The Rutaceae of Papuasia.] Bot. Jahrb. 55: 221–265. *7 fig.* Dec., 13, 1918.—The author presents a synoptical revision of the Rutaceae of New Guinea recognizing 19 genera and 79 species. Only 3 of the 19 genera are endemic to the island while a relatively large percentage of the species, namely 65 of the total number, are not known to occur outside of Papuasia. The new species described are as follows: *Evodia synaptoneura*. *E. Peekelii*, *E. chlorantha*, *E. micrantha*, *E. Bismarckiimontium*. *E. pachypoda*, *E. Ledermannii*, *E. coriacea*, *E. Hunsteinii*, *E. Schraderi*, *Melicope sarcbococa*, *M. papuana* (*Fagara papuana* Lauterb.), *M. iboensis*, *M. trachycarpa*, *M. rupestris*, *M. Dielsii*, *Terminothodia Schultzei-Leonhardi*, *T. obovata*, *Acronychia emarginata*, *A.*

reticulata, *A. reticulata* var. *glabra*, *A. rubescens*, *A. Ledermannii*, *A. cauliflora*, *A. cuspidata*, *Halfordia papuana*, *Hormopetalum gracile*, *H. Werneri*, *H. Pullei*, *Clausenia papuana*, *Lununga papuana*, *Citrus paludosa*, Hunsteinia n. gen., and *H. papuana*.—*J. M. Greenman.*

2995. MAIDEN, J. H. **A critical revision of the genus Encalyptus.** Vol. IV, Part 8. *P. 801–837*, 4 *pl.* William Applegate Gullick: Sydney, 1919.—The present part contains descriptions and critical notes on the following species: *Eucalyptus resellaris* F.v.M., *E. Spencerana* Maiden, *E. Cliftoniana* Fitzgerald n. sp., *E. setosa* and *E. ferruginea* Schauer, *E. Moorei* Maiden & Cambage, *E. dumosa* A. Cunn., *E. torquata* Luehmann, *E. amygdalina* Labill., *E. radiata* Sieber, *E. numerosa* Maiden, and *E. nitida* Hook. f. The first four species enumerated are copiously illustrated. [See also Bot. Absts. 2, Entries 359 and 1355.]—*J. M. Greenman.*

2996. MARSHALL, E. S. **Notes on Somerset plants for 1918.** Jour. Botany 57: 175–181. 1919. [Concluded from *Ibid.* 57: 154.]—Notes are given on the distribution and structural character of plants in the families from the Solanaceae to the Lycopodiaceae and Characeae (Benthamian system.)—*K. M. Wiegand.*

2997. MARSHALL, E. S. **Barbarea rivularis in England.** Jour. Botany 57: 211–212. 1919.—Plants collected by W. D. MILLER in Somerset County had very small pale yellow flowers and crowded erect pods. These were formerly identified as *B. stricta*, a plant clearly distinct from *B. vulgaris*. A study of Rouy and Foucaud's "Flora de France" showed that the proper name of this plant is *B. rivularis* Martrin-Donas (= *B. stricta* Boreau, non Andrz. nec. Fries.). Syme's figure and Babington's description indicate the typical form of this species, while the material cited above is var. *longisiliquosa* Carion. Marks of distinction between *B. stricta* and *B. rivularis* are noted.—*K. M. Wiegand.*

2998. MASSALONGA, C. **Di alcune Podostemacee del Brasile. [The Podostemonaceae of Brazil.]** Bull. Soc. Bot. Ital. 1918: 42–44. *4 fig.* 1918.—The author records four species of *Apinagia* and one of *Mniopsis* from Brazil.—*J. M. Greenman.*

2999. MEYER, RUD. **Echinocereen. [Forms of Echinocerus.]** Monatsschr. Kakteenkunde 29: 14–18. *1 pl.* 1919.—Notes are given on the species shown in the plate entitled Echinocereen Gruppe.—*A. S. Hitchcock.*

3000. MILLSPAUGH, CHARLES FREDERICK, AND EARL EDWARD SHERFF. **Revision of the North American species of Xanthium.** Field Mus. Nat. Hist. Publ. Bot. Ser. 4: 9–51. *Pl. 7–13.* 1919.—Twenty-one species of *Xanthium* are found in North America. Of these, 4 are distinctly new species (*Xanthium australe* from Mexico, *X. calvum* from California, *X. cenchroides* from TEXAS, *X. curvescens* from Vermont) and one other (*Xanthium globosum* Shull from Kansas and Missouri) is described for the first time in accordance with the Vienna Code. Two of the common species, *Xanthium commune* Britt. and *X. canadense* of American authors (not Mill.), are seen to be *X. italicum* Mor. and *X. chinense* Mill. respectively. The Old World *X. strumarium* L. occurs very rarely in North America (Massachusetts and California) and the European *X. orientale* L. is not found here at all. *X. riparium* Lasch of Europe is seen to differ specifically from *X. echinatum* Murr. of North America. *X. bubalocarpon* Bush is identical with *X. speciosum* Kearn. and *X. silphiifolium* Greene likewise equals *X. oviforme* Wallr. A number of additional less well known "species" are merely forms or unstable varieties of older species and hence are reduced to synonymy. The fruiting involucres of each species are illustrated both by photographs and by drawings. Photographs of the type sheets of *X. curvescens*, *X. calvum* and *X. australe* are presented in full-page plates.—*Earl E. Sherff.*

3001. MOORE, SPENCER LE M. **Alabastra diversa. Part XXX. 1 Plantae Rogerianae. IV.** Jour. Botany 57: 86–91. 1919 (cont. from *Ibid.* 56: 212. 1918.)—A further installment of notices concerning, and descriptions of Archdeacon Roger's African Plants, chiefly from

Rhodesia, the northern Transvaal, and a few from Bechuanaland. The following species are described as new:—*Vepris sambesiaca*, *Canthium dictyophlebum*, *C. amplum*, *Fadogia Livingstoniana*, *Pavetta bechuanensis*, *P. Harborii*, *P. cataractarum*, *P. conflatiflora*, *Tripteris auriculata*, and *Anisotes Rogersii*. (to be continued).—[See also next following Entries, 3002, 3003.]—*K. M. Wiegand.*

3002. Moore, Spencer Le M. Alabastra diversa. Part XXX. (2) Thymelaeaceae africanae novae vel notari dignae. (3) Pseudactis, Compositarum e tribu Senecionidearum genus novum.—Jour. Botany 57: 112–119. 1919. (cont. from *Ibid.* 57: 91–92. The author prefers to consider the petal-like organs at the throat of the calyx in the Thymeleaceae scales rather than petals pending a more uniform opinion of their homology. Notes are given on *Struthiola*, *Lachnaea*, *Gnidia*, *Lasiosiphon* and *Arthrosolen*. The following species are described as new: *Struthiola Pentheri*, South Africa; *S. concava*, South Africa; *Gnidia kasaiensis*, Belgian Congo; *G. kundelungensis*, Belgian Congo; *G. dumicola*, Angola; *Arthrosolen paludosa*, Belgian Congo; *A. microcephala*, Angola; *A. Gossweileri*, Angola; *Dicranolepis Talbotiorum*, South Nigeria; *D. angolensis*, Angola; *D. Batesii*, Cameroons; *Peddiea Batesii*, Cameroons.—A new genus and species in the Senecio tribe of the family Compositae, *Pseudactis emilioides*, Belgian Congo, is described. [See also next preceding and following Entries, 3001, 3003.]—*K. M. Wiegand.*

3003. Moore, Spencer Le M. Alabastra diversa. Part XXXI. 1. Miscellanea Africana. Jour. Botany 57: 212–219. 1919.—Descriptions, ranges and notes are given of new plants in the families Ericaceae, Asclepiadaceae and Scrophulariaceae. The following species are described as new: *Philippia kundelungensis*, Belgian Congo; *P. congoensis*, Belgian Congo; *Fockea Monroi*, Rhodesia; *Ceropegia degemensis*, Nigeria; *Craterostigma Monroi*, Rhodesia; *C. chironioides*, Belgian Congo; *Ilysanthes Gossweileri*, Angola; *I. yaundensis*, Cameroons; *Alectra gracilis*, Angola; *Bucknera quadrangularis*, Angola; *B. convallicola*, Belgian Congo; *B. Gossweileri*, Angola; *B. granitica*, Rhodesia; *B. congoensis*, Belgian Congo; and *B. orgyalis*, Angola. [See also next preceding Entries, 3001, 3002.]—*K. M. Wiegand.*

3004. Mousley, H. The orchids of Hatley, Stanstead County, Quebec. Ottawa Nat. 32: 144–147. 1919.—Author gives the habitat of 17 species and one variety of orchids which he found growing within a radius of 1 mile of his residence.—*W. H. Emig.*

3005. Mundt, W. Cereus aurivillus K. Sch. Monatsschr. Kakteenkunde 29: 5. 1919. —Having observed that a flower of *Cereus aurivillus* remained open for 4 days, the author sent it to Weingart for examination.—*A. S. Hitchcock.*

3006. Nakai, Takenoshin. Notulae ad Plantas Japoniae et Coreae XIX. [Notes on Japanese and Korean plants. XIX. Bot. Mag. Tôkyô 33: 1–11. 1919.—Latin descriptions of 28 species of plants from Japan and Korea.—*L. L. Burlingame.*

3007. Nelson, J. C. The gender of Rumex. Amer. Bot. 25: 55–56. 1919.—Names of plants ending in *x*, especially those of classical origin, are usually feminine. *Rumex*, though often considered as feminine is shown to be masculine.—*W. N. Clute.*

3008. Nelson, J. C. Diamond flower in Oregon. Amer. Bot. 25: 65. 1919.—*Ionopsidium acaule* of Portugal noted as naturalized in Oregon.—*W. N. Clute.*

3009. Neuman, L. M. Rubus acupilosus Lidf. och R. nemoralis var. Ruedensis Lidf. [Rubus acupilosus in Sweden.] (Swedish.) Bot. Notiser 1918: 261–264. 1918.—These plants were rediscovered in southern Sweden.—*P. A. Rydberg.*

3010. [Norstedt, C. T. O.] [Swedish rev. of: Gertz, O. Christopher Rostii Herbarium Vivum i Lund.] Bot. Notiser 1918: 214. 1918.

3011. [NORDSTEDT, C. T. O.] [Swedish rev. of: OSTENFELD, C. H. Bemerkninger om danske Træer og Buskes Systematik og Udbredelse I. Vore Aelme-Arter. (Remarks on the systematics and distribution of Danish trees and shrubs. I. Our species of Elms.)] Dansk Skovfr. Tidsk. 1918: 421–442. 1918.] Bot. Notiser 1919: 102. 1919.

3012. PAMPANINI, R. Contributo alla conoscenza della flora della Cirenaica. [Contribution to the knowledge of the flora of Cirenaica.] Bull. Soc. Bot. Ital. 1918: 13–16. 1918.

3013. PENNELL, FRANCIS W. Scrophulariaceae of the local flora. II. Torreya 19: 143–152. 1919. [Continued from Torreya 19: 107–119.]—This installment takes up the tribes Limoselleae, Gratioleae and Antirrhineae, containing the genera *Limosella* (1 species), *Gratiola* (5 species, 1 variety), *Mimulus* (4 species), *Ilysanthes* (2 species, 1 variety) *Hemianthus* (1 species) and *Linaria* (2 species). Notes are added on synonymy and distribution, with keys to the species of each genus. Two new varieties are described: *Gratiola aurea* Pursh var. *obtusa*, and *Ilysanthes dubia* (L.) Barnhart var. *inundata*, both originally collected along the shores of the Delaware River. Two new combinations are proposed: *Ilysanthes inaequalis* (Walt.) which is regarded as synonymous with *I. anagallidea* (Michx.) Rob.; and *Hemianthus micranthus* (Pursh), based on *Herpestis micrantha* Pursh = *Micranthemum micranthemoides* (Nutt.) Wettst. The name *Gratiola viscidula* is proposed to replace *G. viscosa* Schwein. 1824, invalidated by *G. viscosa* Hornem. 1807. The section *Leptoplectron* is established for that part of the genus *Linaria* which includes *L. canadensis* (L.) Dumont.—*J. C. Nelson.*

3014. PENNELL, FRANCIS W. Notes on plants of the southern United States. V. Bull. Torrey Bot. Club 46: 183–187. 1919.—*Dasystephana tenuifolia* (Raf.) comb. nov.; *Acerates hirtella* sp. nov.; *Monarda punctata villicaulis* subsp. nov.; and *Monarda punctata immaculata* subsp. nov. are discussed, together with their diagnostic characters. Records are also given for various other species.—*P. A. Munz.*

3015. PUGSLEY, H. W. Notes on British Euphrasias. I. Jour. Botany 57: 169–175. 1919. —After a study of the British Euphrasias extending over a period of twenty years, the notes contained in this series of papers are written. The validity of some of Wettstein's groups is questioned. The British plant previously considered to be *E. minima* Jacq. is here shown to be distinct from that species, and is described as new under the name *E. confusa*. *E. hirtella* Jord., a plant of the continent, is recorded for the first time as a British plant, having been found at Llanberis in North Wales. A discussion of the distinguishing characters of this species is given.—*K. M. Wiegand.*

3016. ROCK, JOSEPH F. Cyrtandreae Hawaiienses, Sect. Microcalyces Hillebr. Amer. Jour. Bot. 6: 203–216. 4 *pl.* 1919.—This is the fourth and final paper in the author's monograph on Hawaiian species of *Cyrtandra*, and takes up Hillebrand's section *Microcalyces*. There are described five species, of which *C. Giffardii* is new; and three varieties, of which *C. laxiflora* Mann var. *rhizantha* is new, and *C. laxiflora* Mann var. *grandifolia* and *C. polyantha* C. B. Clarke var. *ambigua* are new combinations. An addendum to section *Cylindrocalyces* is presented, in which are described eleven species, of which *C. limoniflora*, *C. montis Loa*, *C. ramosissima* and *C. Hashimotoi* are new; one variety, and one form, a new one, *C. paludosa* var. *brevicalyx* Hillebr. forma *linearis*.—*E. W. Sinnott.*

3017. SALMON, C. E. Norfolk notes. Jour. Botany 57: 190–192. 1919.—Critical notes are given on the occurrence and distinguishing characters of species in *Fumaria*, *Nasturtium*, *Polygala*, *Cerastium*, *Geranium*, *Rhamnus*, *Trifolium*, *Agrimonia*, *Sedum*, *Callitriche*, *Sium*, *Sambucus*, *Valeriana*, *Carduus*, *Scrophularia*, *Symphytum*, *Glaux*, *Rumex*, *Mercurialis*, *Potamogeton*, *Scirpus*, *Carex*, *Calamagrostis*, *Ammophila*, *Glyceria*, *Osmunda*, and *Chara*. The paper is based on a trip to the villages of Hemsby and Ranworth in 1915.—*K. M. Wiegand.*

3018. Schick, C. **Saaterfolge und Kulturbeobachtungen im Jahre 1918.** [Results of seeding and cultural observations in 1918.] Monatsschr. Kakteenkunde 29: 13–14. 1919.

3019. Schlechter, R. **Die Ericaceen von Deutsch-Neu-Guinea.** [The Ericaceae of German New Guinea.] Bot. Jahrb. 55: 145–194. *15 fig.* Dec. 13, 1918.—The author presents a continuation of his taxonomic treatment of the Ericaceae of German New Guinea and includes descriptions of the following new plants: *Rhododendron fuchsioides, R. podocarpoides, R. neriifolium, R. rarum, R. Dielsianum, R. laureola, R. warianum, R. melantherum, R. dasylepis, R. Schultzei, R. Christi* Förtser var. *loniceroides, R. maboroense, R. gardenia, R. Moszkowskii, Diptycosia edulis, D. Schultzei, D. rufescens, D. Ledermannii,* **Disiphon** n. gen., *D. papuanum, Vaccinium Finisterrae, V. sessitiflorum, V. rariflorum, V. Ledermannii, V. sanguineum, V. myrsinoides, V. Schultzei, V. torricellense, V. filipes, V. blepharocalyx, V. stenolobum, V. longiporum, V. scandens, V. grandibracteatum, V. appendiculatum, V. daphniphyllum, Papua viridiflora, P. stenantha, Dimorphanthera albiflora, D. brevipes, D. Kempteriana, D. torricellensis, D. kaniensis, D. racemosa, D. latifolia,* and *D. velutina.*—*J. M. Greenman.*

3020. Schlechter, R. **Eine neue papuasische Burmanniacee.** [A new Papuasian Burmanniacea.] Bot. Jahrb. 55: 202–203. *1 fig.* Dec. 13, 1918.—*Thismia appendiculata* is described and illustrated from specimens collected in northeastern New Guinea. Hitherto the only known representatives of this family in New Guinea have been species of *Burmannia* and *Gymnosiphon.*—*J. M. Greenman.*

3021. Schulz, O. E. **Die bisher bekannten Cruciferen Papuasiens.** [The known Cruciferae of Papuasia.] Bot. Jahrb. 55: 266–272. *1 fig.* 1918.—A very few species of Cruciferae have been collected in New Guinea, and these, with one exception, belong to the two wide spread genera *Nasturtium* and *Cardamine.* In *Nasturtium* four species are listed all of which are described as new: *N. Schlechteri* (related to *N. palustris*), *N. hybospermum, N. homalospermum* and *N. Peekelii.* The second and third are of the aggregate *N. indicum,* while the last is related to *N. eustyle* and *N. sarmentosum.* One variety *N. homalospermum* var. *macrocarpum* is described as new. One species of Cardamine is listed, which is new: *C. papuana* (Lauterb.) (= *C. africana* L. subsp. *borbonica* (Pers.) O. E. Schulz var. *papuana* Lauterb.). Besides the above, the cruciferous species *Papuziella minutiflora* Ridl. is found in New Guinea. Mention is made of *Brassica integrifolia* (Wets.) O. E. Sch. var. *timoriana* (DC.) O. E. Sch. collected by Ledermann on the Eastern Caroline Islands.—*K. M. Wiegand.*

3022. Sipkee, C. **Opmerkingen betreffende in ons land voorkomende Orchidaceae.** [Remarks on the Orchidaceae occurring in our country (Holland).] Nederland. Kruidkundig Arch. 1918: 145–154. May, 1919.—Treatment with critical note of the orchids of Holland comprised in the genera *Ophrys, Orchis, Anacamptis, Herminium, Gymnadenia, Plantanthera, Epipactis* Adans., *Listera, Neottia, Goodyera* and *Sturmia.* Eight new varieties of *Orchis Morio,* one of *Orchis latifolia,* one of *Gymnadenia conopea,* two of *Ptatanthera chlorantha,* one of *Epipactis ochroleuca* and one of *Listera purpurascens* are described.—*J. A. Nieuwland.*

3023. Standley, Paul C. **A new Nyctelea name.** Proc. Washington [D. C.] Biol. Soc. 32: 143. 1919.—*Nyctelea ambigua* (Nutt.) Standl. is proposed for *Nyctelea nyctelea* (L.) Britton. —*J. C. Gilman.*

3024. Vaupel, F. **Keimkehr.** [Return home.] Monatsschr. Kakteenkunde 29: 1–5. 1919.—After an absence of over four years, the author returns to find his specimens of Cactaceae in a deplorable condition. He records notes on several of the surviving species.—*A. S. Hitchcock.*

3025. Vaupel and Mellin. **Januar-Sitzung der Deutschen Kakteen-Gesellschaft.** [January session of the German Cactus Society.] Monatsschr. Kakteenkunde 29: 19–20. 1919.—Vaupel exhibited a plant of *Echinopsis multiplex cristata* bearing a normal shoot.—*A. S. Hitchcock.*

3026. VERDOORN, INEZ C. **The genus Fagara as represented in the South African herbaria.** Jour. Botany 57: 201–205. 1919.—A brief historical sketch is given of *Fagara* as a genus, and its relation to *Zanthoxylum*. Engler reverted to the two Linnean genera as distinct, and this arrangement has been adopted by all subsequent authors. HARVEY divides the South African specimens into 2 species, while SIM reduces them to a single variable one. The present author gives 3 species, 1 of which, *Fagara capensis* Thunb., includes the 2 of Harvey, while the other 2 are new. The new are *F. Thorncroftii*, Transvaal, and *F. Davyi*, Transvaal, Swaziland, Zululand, and Transkei.—*K. M. Wiegand.*

3027. WEINGART, WILH. **Die Blüte des Cereus aurivillus K. Sch.** [The flower of Cereus aurivillus K. Sch.] Monatsschr. Kakteenkunde 29: 6–10. *1 pl., 1 fig.* 1919.—The author records the first description of the flower. The species belongs to *Cleistocactus* Berger and is related to *C. Mansilleanus* Weber and *C. icosagonus* P. DC. The honey chamber is described and compared with that of *C. colubrinus*, another species of *Cleistocactus*.—*A. S. Hitchcock.*

3028. WEINGART, W. **Kleine mitteilungen.** [Minor contributions.] Monatsschr. Kakteenkunde 29: 10. 1919.—(1) To avoid mistakes, the author states that, in his previous article on *Phyllocactus chiapensis* (*Ibid.* 28: 121. 1918), by "purple" he meant the color of Cassius' gold-purple, and that the sepals should be described as narrowly triangular instead of "spiessförmig." (2) Spineless *Opuntia* obtained from LUTHER BURBANK produced spines at Erfurt. Spineless specimens of *O. ficus-indica* from Sicily produced spines when grown at Erfurt. The author thinks it doubtful if spineless forms should be recommended for fodder on sterile soil. [See next following Entry, 3029.]—*A. S. Hitchcock.*

3029. WEINGART, W. **Kleine Mitteilungen.** [Minor contributions.] Monatsschr. Kakteenkunde 29: 18–19. 1919.—(1) Differences between *Cereus Gonzalezii* Web. and *C. tinella* Web. are given. (2) Concerning *Cereus acanthosphaera* Wgt. (op. cit. 24: 83. 1914) the author adds that lenticels take the place of stomata. (3) Indigo in the parenchyma (op. cit. 84) was not demonstrable, the light blue tinge coming from the packing. (4) A previously mentioned *Cereus* from Zacapa (Guatemala) is discussed (see op. cit. 26: 76. 1916). (5) The author gives a note on *Cereus rostratus* Lem. (see op. cit. 19: 186. 1909). [See also next preceding Entry, 3028.]—*A. S. Hitchcock.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

BURTON E. LIVINGSTON, *Editor*

3030. ANONYMOUS. **Rubber substitute from German plants.** Sci. Amer. Suppl. 87: 237. 1919.—The sap of certain Euphorbiaceae has been shown to contain a rubber-like constituent which can be isolated.—*Chas. H. Otis.*

3031. ANONYMOUS. **The vegetable oil industry of Japan.** Sci. Amer. Suppl. 87: 229. 1919.

3032. ANREP, A. **Investigation of peat bogs in Canada.** Jour. Amer. Peat Soc. 12: 84–88. 1919.—Ten bogs were investigated with a view to their utilization. Their combined area is 4902 acres. Their depth varies from 3 to 30 feet. Some of the peat in them is suitable for fuel and some of it for litter.—*George B. Rigg.*

3033. BARNARD, JOSEPH E. **The limits of microscopy.** Jour. Roy. Microsc. Soc. 1919: 1–13. *1 fig.* 1919.—It is shown that a clear conception of magnitudes involved and the relation of the microscopic resolution to wave-lengths of light and to molecular dimensions is necessary. An object may be visible to the unaided eye, even though one of its dimensions is far below the range of microscopic resolution. By the use of a solid cone of illumination the structural elements of the order of 3μ can be resolved apart, and by the use of oblique light this interval can be halved. The resulting image bears only a quantitative relation

to structure. Visibility may be secured under most favorable conditions of a particle of the order of 5 micromillimetres in diameter, but the resulting images of objects, ranging in size from the limits of resolution to the limits of visibility are not such that any idea of form or condition can be established. It is merely a proof that the objects exist; other physical tests must be applied to approximately determine their size and state. Therefore the limits of resolution are dependent on the effective numerical aperture of the observing system and the mean wave-length of the illuminant. The limits of resolution of two separate objects may be taken as the absolute limit of resolution for all isolated objects that can be seen and observed as definite entities. The limits of visibility are dependent on the difference of refractive index between the object and the medium in which it lies, and on the intensity of the illumination. By detailed description of the ultra microscope it is shown that the effectiveness of the instrument is dependent on the concentration of a great quantity of light on a small area, so that only a few of the particles in the field of view are illuminated. The illumination of particles in depth is controlled to ensure that none above or below the focal plane of the observing objective are brought into view.—*Julia Moesel.*

3034. Blunck, Gustav. **Verwendung des Glyzerinersatzmittels "Glyzinal" in der Mikroskopie.** [Glycerin substitute "Glyzinal" in microscopy.] Zeitschr. Wiss. Mikrosk. 35: 249–251. 1919.—A commercial product similar in some respects to glycerin, said to be based on a mixture of dipyridiabetain-NaCl and dipyridin-$CaCl_2$. Recomended as clearing and preserving fluid.—*H. G. Barbour.*

3035. Chamberlain, Edward B. **A herbarium note.** Bryologist 22: 39–40. 1919.—Loose-leaf binders are advised for the preservation of small collections and exsiccatae; the specimen-envelopes are pinned directly to the sheets.—*Edward B. Chamberlain.*

3036. Conard, Henry S. **Relation of the community to the preservation of wild plants.** Rept. Iowa State Hortic. Soc. 53: 385–390. 1918.—Calls attention to the wealth of material among our native plants for park purposes. The Atlantic seashore is gilded with goldenrods like *Solidago sempervirens*, the salt marshes with Sabbatiae, nowhere is greater beauty displayed than on the hills and prairies of Iowa.—*L. H. Pammel.*

3037. Coupin, H. **Sur le montage de quelques préparations microscopiques.** [On the mounting of some microscopic preparations.] Rev. Gén. Bot. 31: 109–114. 1919.—Author reviews objections to the use of the ordinary mounting media for certain objects, and recommends several new ones for which excellent results are claimed. Stained sections may be mounted directly from water, alcohol or glycerine in a medium made up as follows: 0.8–1 per cent aqueous solution of $HgCl_2$, 35 cc.; gum arabic, 30 grams; glucose, 10 grams. Filter. Seal mount.—For mounting pieces of epidermis: gum arabic, 10 grams; glucose, 5 grams; water, 10 cc.; crystal of thymol or few drops of formol as preservative.—For unicellular algae: 0.8–1 per cent aqueous solution of $HgCl_2$, 35 cc.; glucose, 10 grams; gum arabic, 30 grams; ammoniacal copper chloride, 1 gram. Filter.—For filamentous algae: 0.4 per cent aqueous solution of $HgCl_2$, 500 cc.; gelose, 5 grams; ammoniacal copper chloride, 1 gram. Boil and cool. Melt a piece on the slide and just before it cools add algae and cover. Seal.—For pollen grains: vaseline oil.—*L. W. Sharp.*

3038. Curtiss, C. F. **Forest parks and their relation to the rural community.** Rept. Iowa State Hortic. Soc. 53: 363–364. 1918.—Suggests that the fee for hunters licenses be utilized for park purposes and game reserves.—*L. H. Pammel.*

3039. Davidson, S. C. **Coal from peat.** Jour. Amer. Peat Soc. 12: 16. 1919.—British patent covering a method of preparing synthetic coal from peat.—*George B. Rigg.*

3040. Georgi, J. **Zur Verwendung flächenmessender Instrumente in der Mikrotechnik.** [Surface-measuring instruments in microscopic technique.] Zeitschr. Wiss. Mikrosk. 35: 175–188. 1919.

3041. HORCHEM, B. J. **What was accomplished in regard to state parks in the 37th General Assembly.** Rept. Iowa State Hortic. Soc. 53: 378–379. 1918.—A brief history of the Iowa legislation for the creation of state parks.—*L. H. Pammel.*

3042. K[IRCHNER], O. [Rev. of: KAISERLING, CARL. **Die mikrophotographischen Apparate und ihre Handhabung.** (Microphotographical apparatus and their use.) *60 illustr. Stuttgart.*] Zeitschr. Pflanzenkrankh. 29: 48. 1919.—This volume published as vol. 4 of the Handbook of Microscopic Technique deals with the microscope, photographic apparatus, source of illumination, and related subjects.—*H. T. Güssow.*

3043. KRUGENBERG, B., AND E. TH. TIELEMANN. **Weitere Mittallungen über die Färbung WEP (Dioxychrom) und über zwai neue Trioxychroma.** [Further report on "WEP" (dioxychrome) stain and two new trioxychromes.] Zeitschr. Wiss. Mikrosk. 35: 170–174. 1919.

3044. LAZELL, FRED J. **Action needed in conservation.** Rept. Iowa State Hortic. Soc. 53: 353–356. 1918.—Urges the importance of creating state parks in Iowa.—*L. H. Pammel.*

3045. LEES, JAMES H. **Park sites along the Des Moines valley.** Rept. Iowa State Hortic. Soc. 53: 367–371. 1918.—Gives an account of places along the Des Moines river suitable for park purposes. He begins with Tuttle Lake, following the river down to its mouth, giving an account of the geology of the region.—*L. H. Pammel.*

3046. LINDET. [Rev. of: ROLET, S. **Plantes à parfum at les aromatiques.** (Perfume plants.) *452 p., 100 fig.* 1918.] Compt. Rend. Acad. Agric. Franca 5: 403–404. 1919.—A brief review of thie book and a discussion of the availability of much of Franca for the perfume industry.—*E. A. Bessey.*

3047. MAYER, P. **Über die sogenanntan Sublimatkristalle in mikroskopischen Präparaten.** [So-called sublimate crystals in microscopic preparations.] Zeitschr. Wiss. Mikrosk. 35: 161–169. 1919.

3048. MCNIDER, MRS. C. H. **What the Mississippi Valley national park would mean to Iowa.** Rept. Iowa State Hortic. Soc. 53: 360–363. 1918.—Gives an account of the yellow lotus (*Nelumbo lutea*) and the scenic beauty of the region about McGregor, Iowa.—*L. H. Pammel.*

3049. NAUMANN, EINAR. **Ein einfaches Zeigerokular.** [Simple demonstration ocular.] Zeitschr. Wiss. Mikrosk. 35: 248. 1919.

3050. NAUMANN, EINAR. **Über die okulare Begrenzung das mikroskopischan Gesichtsfeldas.** [Ocular limitation of microscopic field of vision.] Zeitschr. Wiss. Mikrosk. 35: 241–242. 1919.

3051. NAUMANN, EINAR. **Über dia Einteilung des Gesichtsfeldas beim Zählen mikroskopischer Körper.** [Division of field of vision for microscopic counting.] Zeitschr. Wiss. Mikrosk. 35: 245–247. 1919.—A "universal" counting device. By means of a reflector any sort of counting field outside of the microscope is thrown in through the condenser.—*H. O. Barbour.*

3052. ORR, ELLISON. **Conservation and education.** Rept. Iowa State Hortic. Soc. 53: 351–353. 1918.—Gives a brief résumé of the proposed national park at McGregor, Iowa, and the importance of preserving the natural beauty, wild animal and plant life of Iowa. Calls attention to the occurrence of the balsam fir on the Yellow River in Allamakee county, Iowa. —*L. H. Pammel.*

3053. OSBORN, C. C. **Peat in the Dismal Swamp, Virginia and North Carolina.** United States Geol. Surv. Bull. 711: 41–59. *Pl. 4–6 (including 1 folded map).* Nov., 1919.—This seems to be largely a compilation from the writings of previous investigators, some of

which are not specifically mentioned. Some of the commoner plants are listed, and two of the four half-tone illustrations show vegetation. The principal original contribution is the description and analysis of peat samples from about half a dozen localities in the swamp. The second half of the paper deals with the uses of peat in general.—*Roland M. Harper.*

3054. Osborn, C. C. Possibilities of peat. Jour. Amer. Peat Soc. 12: 7–16. 1919.—Peat is used for fuel, fertilizer, fertilizer filler, and stable litter. It is also used as a source of gas, charcoal and coke, in the preparation of surgical dressings, and in the preparation of substitutes for wood and cotton and woolen cloth, also as an absorbent for the uncrystallized residues of beet sugar refineries and in the manufacture of stock feed. Only a small fraction of the total peat available in the United States is now being utilized.—*George B. Rigg.*

3055. Shimek, B. Conservation of natural scenery in Iowa. Rept. Iowa State Hortic. Soc. 53: 372–375. 1918.—The preservation of these places will prevent erosion. Needed to supply moisture for the atmosphere. These places should also be preserved for scientific purposes.—*L. H. Pammel.*

3056. Shimek, B. Iowa's natural parks. Rept. Iowa State Hortic. Soc. 53: 364–367. 1918.—A list of places in the state that should be set aside for state parks.—*L. H. Pammel.*

3057. Small, Mrs. W. B. A natural park site. Rept. Iowa State. Hortic. Soc. 53: 371–372. 1918.—Discusses the Devil's Backbone area in Delaware county, Iowa.—*L. H. Pammel.*

3058. Taylor, Mrs. H. J. Conservation of life through city parks. Rept. Iowa State Hortic. Soc. 53: 376–378. 1918.—The waste of natural resources has led to emphasis upon conservation.—*L. H. Pammel.*

3059. Triepel, H. Ein neues Modellierverfahren. [New modelling method.] Zeitschr. Wiss. Mikrosk. 35: 89–94. 1919.

3060. Turner, C. Distillation of peat. Jour. Amer. Peat Soc. 12: 101–102. 1919.—British patent 117,645, 1917 covers the distillation of peat. Among the products are ammonia, methyl alcohol, acetone, acetic acid, pyridine, mono-phenols, guiacol, cresol and other phenols, a petol-like spirit, other neutral acids, and paraffin waxes.—*George B. Rigg.*

3061. Willmarth, C. A. Willmarth peat fuel process. Jour. Amer. Peat Soc. 12: 113–122. 1919.

INDEX TO AUTHORS' NAMES IN VOLUME III

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